CEREAL SCIENCE today

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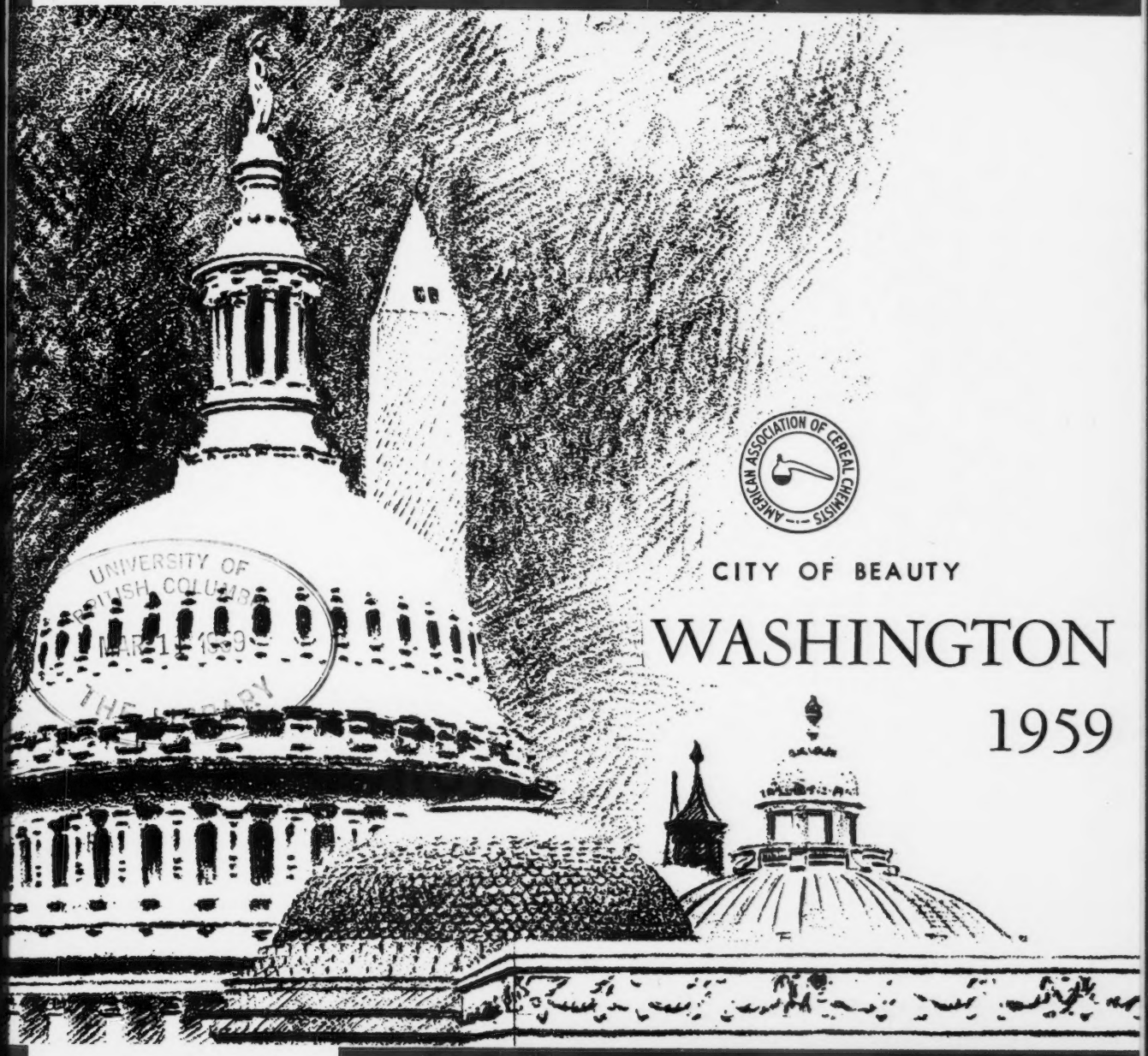

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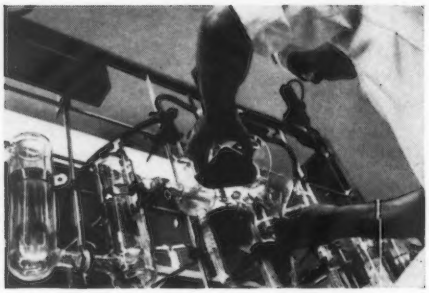
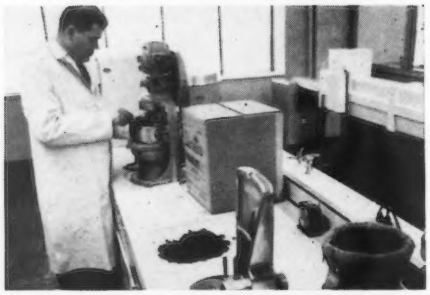
OF INTEREST THIS MONTH

A CASE FOR DISCUSSION
AACC PRELIMINARY PROGRAM
TASTE AND TEXTURE AFTER LYSINE USE





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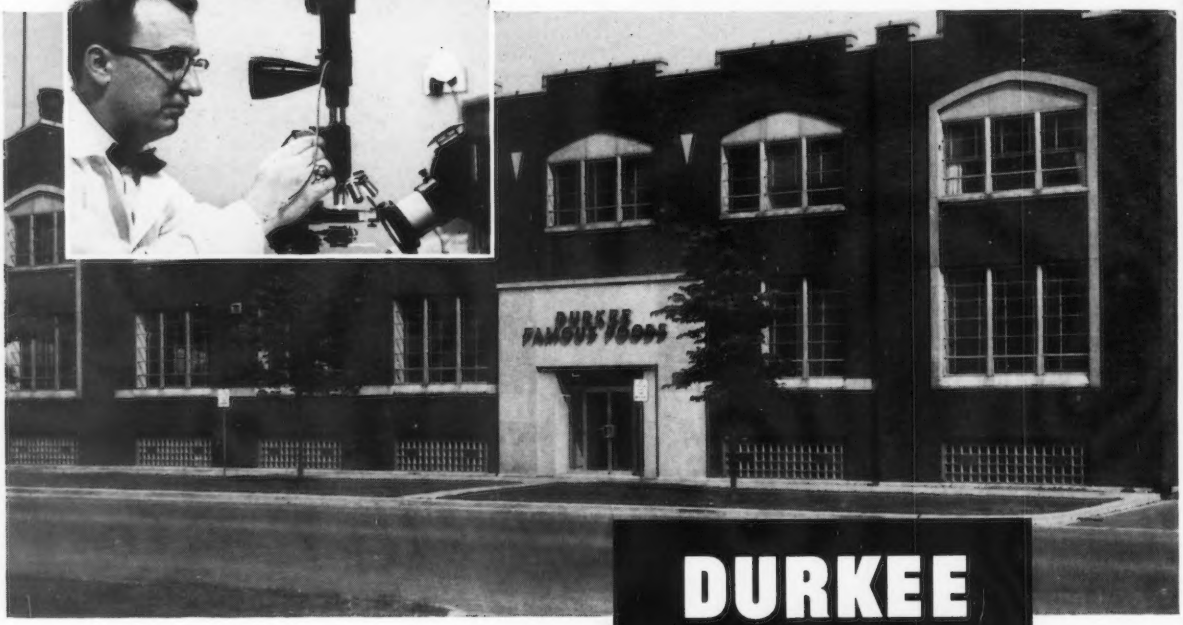

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INSIDE SCIENCE

THE VITAL STORY OF

Breakfast Cereals

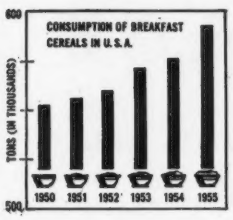
with essential vitamins and minerals restored

by Science Writer

New Edition

AMERICA LIKES BREAKFAST FOODS

Let no one doubt the popularity of breakfast cereals among Americans. The chart below traces the consumption of these fine foods between 1950 and 1955. During that period annual consumption rose by *76,000 tons.* In just one year, 1955, Americans ate 2½ lbs. of hot and 4.8 lbs. of cold cereals per person!



Why are breakfast cereals so well-liked? They are tasty; they are easily served; they appeal to busy homemakers, as well as institutional dietitians, because they are readily available in a variety of flavors at a modest cost. They add interest and value to an important but sometimes neglected meal —breakfast. Their use is extending to between-meal and party snacks, too.

Many grains are processed to make breakfast cereals: wheat, corn, oats, rice. Eaten with fruit and milk or light cream, they contribute an excellent combination of basic, flavorful, nutritious foods to the diet.

Better Foods for Better Health Through Restoration

The science of nutrition has advanced rapidly. In the manufacturing process of some cereals, some of the essential "B" vitamins and minerals are subject to some loss, just as with other foods. These losses are inescapable when such grains are prepared for human use. When this became known, manufacturers acted to overcome the losses. They adopted restoration.

Restoration simply means that certain important vitamins and minerals are restored to the cereal food during processing, so that the vitamin and mineral values in the finished product are generally equal to the whole grain values of those elements. Wheat, corn and rice products are customarily so treated. Vitamins B_1 (thiamine), B_2 (riboflavin), niacin (another "B" vitamin), and the mineral, iron, are those most widely restored. Vitamins C and D are also sometimes added.

Pre-sweetened cold cereals emphasize the nutritional importance of added vitamins. Increased calories require more "B" vitamins for best utilization of the food.

Why the Vitamins are Important

Physicians and diet experts have proved that vitamins are essential to prevent certain deficiency diseases and to contribute to robust good health.

Vitamin B_1 (thiamine) helps build and maintain physical and mental health. It is essential for normal appetite, intestinal activity, and sound nerves. A lack of this vitamin leads to beriberi, a rarity in the U. S. A., but still a very serious health problem in other parts of the world.

Vitamin B_2 (riboflavin) is essential for growth. It helps to keep body tissues healthy and to maintain proper function of the eyes.

Niacin is needed for healthy body tissues. Its use in the American diet has been largely responsible for the virtual disappearance of pellagra, a serious disease.

Vitamin D helps children develop normal teeth and bones. It prevents the development of certain abnormal bone conditions in adults.

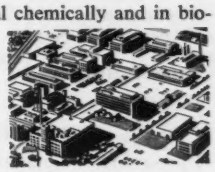
Iron is essential for making good red blood and for the prevention of nutritional anemia.

Where Do the Vitamins Come From?

At about the same time that processing losses in breakfast cereals became known, other developments in the scientific world made available ample supplies of vitamins at economical prices. Thus, the nutritional contribution of some breakfast cereals could be, and was, greatly improved through restoration.

Since the early days of breakfast food restoration and of white flour and white bread enrichment, the world-famous firm of Hoffmann-La Roche has supplied top quality vitamins *by the tons.* Pioneering work in its laboratories and by its collaborators resulted in the "duplication" of some of nature's extremely complex substances. First, the chemical composition of the vitamin was learned. Second, the pure substance was isolated. Third, the "duplicate" was made by synthesis. And fourth, the laboratory techniques were extended to large scale commercial operations.

The manufactured "duplicate" is identical chemically and in biological activity with nature's own product. A vitamin is still a vitamin regardless of whether nature or man made it. So efficient is large-scale manufacturing, that vitamins are sold at a lower cost than if they were extracted from natural sources.



This article is one of a series devoted to the story of vitamin enriched or restored cereal products: white flour, white bread and rolls, corn meal and grits, macaroni products, white rice, breakfast cereals, farina. Reprints of this article, of any other in the series, or of all are available without charge. Please send your request to the Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 1956 Bourdon Street, St. Laurent, P. Q.

LETTERS to the editor

More on Silicone

DEAR SIR:

As was recently reported in CEREAL SCIENCE TODAY (March, 1958, p. 64, "Silicones may affect cake quality"), infinitely small amounts of some types of silicone may cause cake failure. In these failures, the very powerful defoaming characteristics of some silicones cause the foam-emulsion (cake batter) to break, and therefore the cake will not rise.

The dimethyl fluids (dimethyl polysiloxane) seem to be especially powerful in this respect. These silicone fluids are commonly used in lubricants, hand lotions, slip agents, defoamers, paints, and many other products. As an illustration, a housewife may apply a silicone-containing hand lotion just prior to making up a cake mix, and in her handling of the beaters and dishware sufficient silicone could be transferred to cause cake failure.

As a supplier of silicone-treated papers to the baking industry we, the KVP Company's research department, were most concerned to determine if the silicone used on our bakery release sheets could be responsible for cake failure. Several cakes were baked in our laboratory with many times the amount of cured silicone resin added that is present in one square foot of releasing paper. Results — no cake failure.

As we are relatively inexperienced at cake evaluation, we sent samples of cured silicone resin to the author of the report mentioned above. Our findings were verified in his laboratory where cakes were baked with the addition of 0.03 and 0.06 g. of silicone corresponding to two and four times the amount of silicone applied to one side of 1 sq. ft. of paper, again without cake failure.

The type of silicone used on KVP baking sheets is methyl hydrogen silicone. This material is a fluid when applied, but cures on catalysis to a glassy, highly crystalline resin offering water repellency and release but little defoaming ability after cure.

We wish to point out that not all silicones are responsible for this type of baking failure and that, in general, if a silicone is a fully cured resin rather than a fluid, the chances of its exhibiting strong defoaming characteristics are slim.

KVP Company
Kalamazoo, Michigan

H. B. PARKER

Terminology

DEAR SIR:

In the article by Dr. R. P. Choi entitled "Dry Milk — Processing for Specific Uses" in the February 1959 issue of CEREAL SCIENCE TODAY, a rather widespread misconception is discussed. This is the term "absorption" as used in the farinograph method for the determination of baking properties of dry milk solids. As Dr. Choi points out, the absorption of the milk itself bears no real relation to its baking properties. In the farinograph test one is not interested in the absorption of the milk itself; only in the absorption of an equal mixture of flour and dry milk solids. The absorption of the flour may be determined by itself, the absorption of the milk may also be determined separately. Then if the average absorption is applied to an equal mixture of flour and milk solids, the viscosity is indicative of the baking properties of the milk. A flour with a good absorption and a milk with a good absorption may produce a mixture with a very low absorption. This indicates a poor baking milk.

The effect of a poor baking quality milk in the commercial bakery is primarily on the dough and on the crumb structure. I have never seen much effect on volume; actually doughs containing poor milk tend to produce larger loaf volume loaves than does good quality milk. This is due, I believe, to the slackness of the dough. I believe that too much emphasis on the loaf volume effect in laboratories not directly connected with the baking industry may lead to unreliable conclusions.

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CEREAL SCIENCE today

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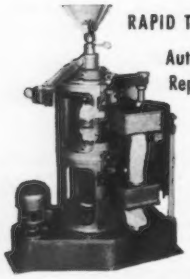

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Editorial

MANY WRITERS HAVE pointed out that today science is better known to the public than are scientists. Widespread misconceptions exist about the sort of people scientists are, what they do, and how they think. Some believe that scientists are trained to think alike and work according to a rigidly fixed "scientific method." Results of a recently published survey showed a wide divergence between what high school science teachers thought were scientists' attitudes and beliefs and what the scientists said they were.

Here is a serious situation. It may hamper the recruiting of adequate numbers of the kind of people needed to fill the ranks of scientific workers in the future. It suggests that there may also be communication barriers between scientists—barriers that limit the catalysis of a person's thoughts by the ideas of others.

Within the A.A.C.C. there may be individuals with problems who are unaware that others in the organization may have the solutions or the means to get them. There may be someone with a theory but without access to the laboratory facilities needed to test its validity. A person may plan a research program following currently popular research trends but miss an opportunity to make an important contribution because he was not aware of what kind of knowledge is needed to solve current practical problems.

There is need for more communication between scientists and those who can use scientific knowledge. It is a need for something in addition to the publication of research data. For the field of cereal chemistry, CEREAL SCIENCE TODAY can help fill this need.

On page 62 of this issue there is an article entitled "A Case for Discussion." Mr. Loska, the author, makes a plea for less conformity and more thinking out loud. Whether you agree or disagree with Loska's ideas on scientific papers and physical testing, your own thinking is likely to be stimulated by his paper. We hope that such stimulation will motivate many of you to express your own views on these and other controversial matters.

P.E.R.

A CEREAL CHEMIST PRESENTS

A Case for Discussion

By Stephen J. Loska, Jr., Pillsbury Co., Inc., Minneapolis, Minnesota

RECENTLY A. E. FREY, in a letter to the editor of another food-field journal,[1] capably pointed out the trend of scientific presentations and technical meetings. Mr. Frey contends that "There is an increasing trend for papers to become less interesting." Regrettably, this is not only true because of the mechanics developed in scientific presentations, as discussed by Mr. Frey, but it reflects a deeper problem.

The problem is one of restraint which, if it continues to develop, could strangle our profession. Restrained articles and convention papers are the direct result of cautious contradiction of previous work and limited interpretation and discussion of current research work. The reasons for limiting interpretation are many, but among them is the fear of being wrong or having one's neck out. Review policies which allow criticizing an author's interpretation add to many writers' reluctance. This leads to a situation in which cereal chemists are protecting themselves by joining schools of accepted thought.

The contrasting policy of European journals allows a greater freedom of thinking and, more important, a greater freedom of expression. Perhaps in many cases time will prove that a position was not justified; but who cares? In the meantime the man in error in one problem may have moved ahead correctly many times, and those who disagreed with the author have added to the general progress by disputing the old theory.

Papers in the United States, particularly in the food field, are becoming less interesting but more rigorous in conforming to "accepted" style. Thus, to be on safe ground, the research worker limits himself to obvious conclusions and avoids those which in any way may not be fully justified by the "facts" or "data." This leads only to a system of deductive reasoning and throttles the second means of increasing knowledge — the route of inductive reasoning.

Eliminate the review paper, and there are few, if any, workers who have taken a strong position on any subject in print, unless they strengthened it by "clear indications" from their own data.

Another consideration which fosters this withdrawal from criticism is the lack of available time during convention programs. Discussion and questions have virtually disappeared from our meetings, at least at the convention-floor level.

Reflect for a moment, and examine our regular course of behavior.

The "Acceptable" Approach

When a cereal scientist approaches a problem, once it is well defined, instinctively his first act is to "review the literature." Periodically, a person may do the same in an area of work to keep abreast with progress. To keep abreast with progress is a commendable act in itself, but a little soul-searching might reveal that some of the satisfaction of literature-searching comes from sentimental reasons. For indeed, each of us becomes a part of scientific history from the day his first work appears in print. It is quite easy to consider phases of history as good and in the natural course of events — even in the history of the pursuit of knowledge. In our particular field, which is small enough for us to have personal association with many of the contributors to our knowledge, the price of criticizing old work could be to gain a reputation as a heretical, impractical, dreamy-eyed idealist.

Since the cereal field is admittedly complex, we must be satisfied with solutions to problems which are not solutions, but merely secondary, perhaps lower-order, indices of a property or behavior.

No clearer demonstration can be made than to choose one particular flour and then list all the indices needed to give the best possible assurance of predictability of its behavior under any given set of circumstances. Exclude, if you will, those indices which are required by legislature, such as vitamin addition.

The list would be a staggering collection of both chemical and physical tests describing or measuring attributes of a flour — all this, to put into numerical form values to express the absence or presence of a property perceived by the senses! If the number of indices is indicative of the lack of an orderly understanding of the flour's operational mechanism, we should expect a great deal of criticism of our present flour-property indices and our concept of flour in general.

Sample Case: Physical Testing

Is it possible, then, to introduce new thoughts into our field without resorting to the "accepted" form of introduction, materials and methods, results and conclusions? Perhaps it is; so let's pick a subject and kick it around a little. Physical testing is always a provocative subject and may serve as a case to bring this discussion from the general to the particular.

Physical tests, as generally used today, may be fewer in number than chemical tests, but the cost per datum makes them just as liable to criticism. Twenty years or more have taken the blush of newness from the tests which held so much promise. The proper use of physical tests has helped us to

[1] Food Technol. *12:* 636 (1958).

understand the attributes of flours. It appears, though, that a plateau of worth is being approached, and it is still not the level of satisfaction hoped for some twenty years ago. Since our hope is always satisfactory knowledge for efficient use, it behooves us to examine what we have, and to ask:

Do we have enough indices (data if you will) to understand flour behavior?

Do we have enough physical tests, but not proper interpretation?

Stretching vs. Mixing Tests

In the field of the rheology of resting doughs, the series of articles by the staff of the Grain Research Laboratory of Canada has added a great deal to the understanding of the somewhat empirical tests using the Extensograph,® alveograph, extensimeter, and the "rack." Here, at least, physical indices are developed to a relatively high level of interpretation.

In contrast, the mixing indices resulting from the mixograph and the farinograph are lacking in the scrutiny necessary to bring them to the understanding and usage level of the stretching tests. It can be said that a great deal of interpretation is wanted, though this should not exclude the first question.

The word *mixing* has so many meanings, but the conception of what the word means is for the most part connected to a particular machine that does the job of mixing. At the risk of being otherwise advised, this writer recalls no high-level expression in the form of mathematics, the language of the physicist, explaining the action, cause, and effect of mixing upon flour and water. At least there are no written studies of dough mixing and mixers which fill volumes as do the studies of the theories of grinding, dry blending, and sifting.

Yet it is possible to determine the optimum mixing time of a flour by torque or other means for commercial or laboratory mixers. In a stricter sense, the optimum consistency and the optimum time for a flour-water system *and* a particular mixer may be determined. The optimum consistency might well be quite different on another mixer just as the time might be different. Thus, the word *optimum* is used in a very limited sense and has no absolute value.

Stickiness of Dough

In addition to these, the consistency and time may be ascertained subjectively by using our eyes and sense of touch. Examine for a moment what happens in a mixer, as our senses tell us. Assuming that the absorption estimate is correct, a white powder is transformed into a lumpy, off-white mixture during the first interval of time. As it forms a mass entity, it slowly transforms from a knotty, irregular mass to a smooth homogeneous mass, losing the luster of moisture and moving as a plastic mass. Somewhere the eye notes the reappearance of stickiness exhibited by the attachment of the dough to the walls of the mixer. The touch confirms this; also, usually a loss of elasticity or the ability of the dough to retain its shape is noted.

If the sense of touch is restrained from confirming or denying what the eye sees, it would be a safe assumption that the first sign of stickiness, as exhibited by adherence to a part of the mixer, would be the only criterion used. Whether this sticking is exhibited because the structure is losing its strength to withstand deformation to the point where the force of adhesion equals or exceeds this force is a moot question. The use of this property of stickiness is an indication of overmixing in general among production or test laboratory bakers. To illustrate from recent citations:

Scott Blair (3) states:

> With regard to stickiness, however, differences in water content of 1–2% could be detected (subjectively) between two otherwise identical doughs. It is therefore understandable why the baker places so much emphasis on this property. What he really does in making doughs is to produce a minimum of stickiness with a maximum of water absorption. This is in agreement with the view of Halton and Scott Blair that, with the majority of flours, when the doughs have the required minimum degree of stickiness their other properties are also in a condition for giving satisfaction in the bakehouse.

Miller *et al.* (2) state, "The criteria for optimum mixing time included extensibility, smoothness, and dryness of the dough. Mixing was stopped before the dough developed any undesirable degree of stickiness." These are just two illustrations of common judgments of stickiness.

Thus, the sense of touch is used with regularity to establish both the property of absorption through consistency and the mixing time. Since the sense of touch is used, an examination of the properties of the dough which contribute to the physiological response may lead to a better system to evaluate optimum absorption and/or mixing time.

Analogy with Printer's Ink

The search of the literature for an analogous situation stops very early with Green's (1) studies in the field of printer's ink, where the sense of touch also plays an important role. He lists the possible factors which enter into the printer's evaluation of tack as viscosity, yield value, surface tension, adhesion, and cohesion (tensile strength). With a tackmeter, a form of parallel plate viscometer, he observes the behavior of the ink between a tip (one plate) and the second plate as they are drawn apart in a direction normal to their parallel position.

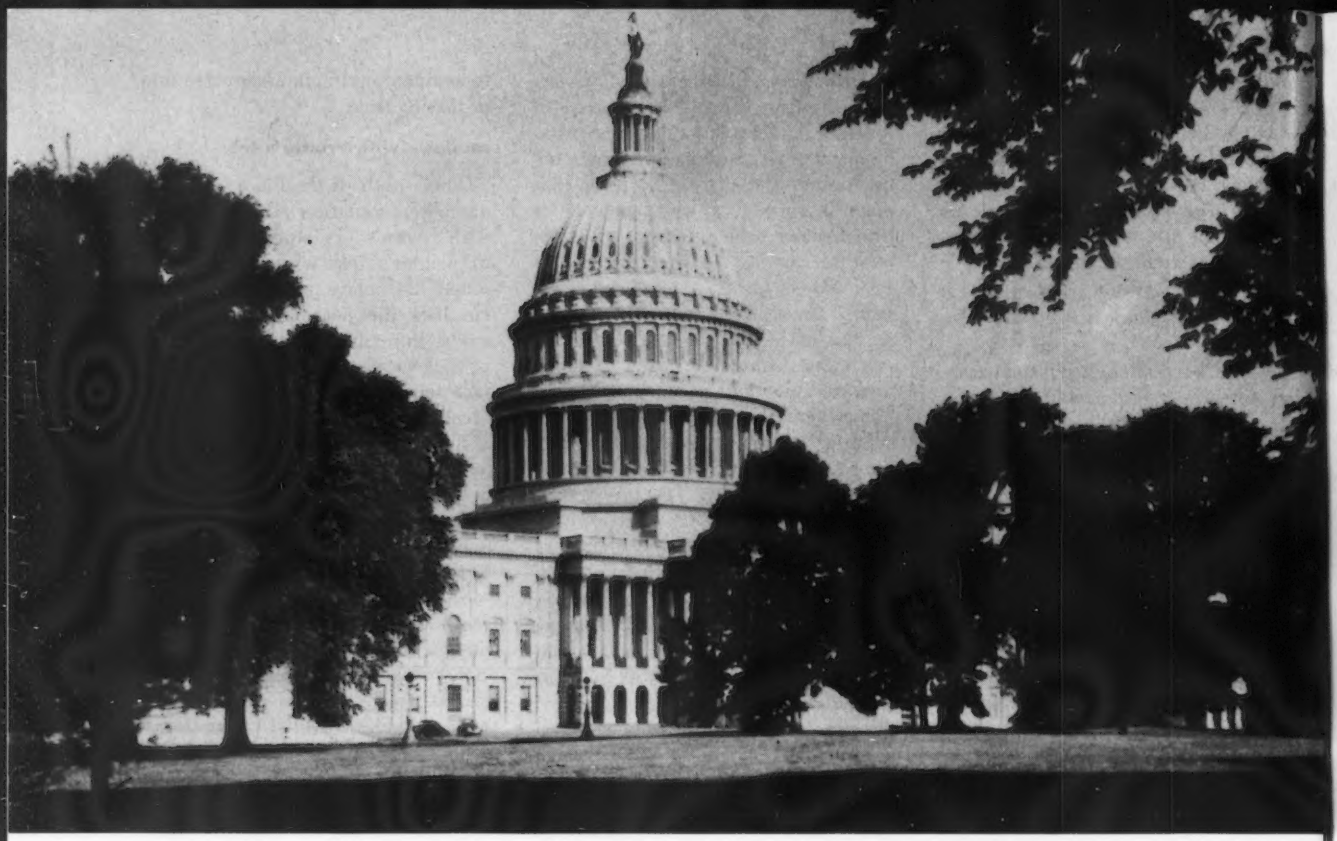
In the case of ink, that which is lying around the tip is drawn under the tip and the ink commences to "neck down." As the plates are separated, the ink necks down to near molecular dimensions. From this he concludes that the force of cohesion is negligible. In dough, except when very soft and sticky, it can be estimated that it would not be so finely drawn and that the forces of cohesion do enter into the concept of tack.

The second observation is that when the ink sample breaks, it adheres firmly to both plates and no work is performed against adhesion. With dough, chances are that the opposite would be true and that adhesion is a factor and stickiness will include the work against adhesion.

Since two new surfaces are created in the case of ink and the work of cohesion (already reasoned to be small) is equal to twice the surface tension, then surface tension is negligible. Thus, only two possibilities are left: viscosity (plastic) and yield value. It can be judged already that in the case of dough, surface tension, adhesion, cohesion, viscosity, and yield value would be under scrutiny.

Though tack is not a material constant but a quantity dependent on the material, the thickness of the material, the area of the finger tip, and the speed of the finger separation, yet it can be defined as pull resistance. Pull resistance may have to be qualified to certain conditions such as sample thickness, the material of the tackmeter, area of the finger tip, rate of separation, temperature, and perhaps other variables; but without investigational work, who is to say

(Please turn to page 79)



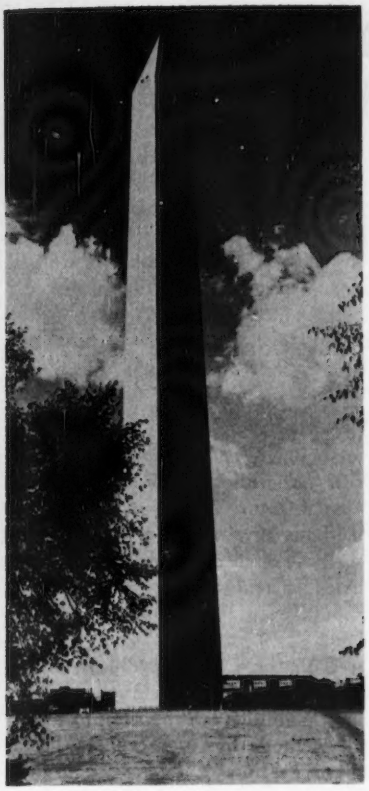
AACC MEETS IN WASHINGTON, D.C.

ALTHOUGH WASHINGTON, D. C., BEING the Nation's Capital, is one of the world news centers, the only news that members of the AACC arrangements committee have in mind is that the 44th Annual Meeting will be in this city May 3rd through 7th at the Statler Hotel. There has been tremendous activity and enthusiasm in planning the scientific program, the exhibits, social events, and the many other activities this city can offer.

The Program for the technical sessions is bursting with interesting, timely, and valuable topics, including Baking and Bakery Products, Practical Aspects of Cereal Testing, Grain Structure and Grain Constituents, The Wet Milling Industry, Grain and Milling Technology, Grain Sanitation, Grain Drying, Cereals in Feeds, Cereals in Foods, The Food and Drug Administration and the Cereal Chemist, Current Trends in Fundamental Research as related to the Cereal Chemist, and the Technical Committee Reports. The Washington scene will give the AACC members and guests the unusual opportunity to hear outstanding authorities in the Agricultural and Educational fields who will be present and express their opinion on topics of current interest in the field of cereal science.

With equal interest the organizational and social aspects of the meeting are being planned. The President's Reception and Mixer on Sunday, May 3rd will be a distinctive and heart-warming occasion. This year an additional pleasure will be accorded members in that the Association also is honoring the Past-Presidents of the AACC, many of whom will be present. The Annual Banquet of the Association will be held on May 6th in the Presidential Ballroom of the Statler.

In addition to the traditional social events of the meeting, many other activities are available to the majority of the 1200 members and their families who will be in Washington, D. C. Planning these in a city with such a wealth of historic, political, architectural, cultural, and entertainment interests has afforded members of the local arrangements committee the pleasure of unusual selective opportunity. There will be days for the ladies filled to the minute with tours of the National Monuments (the Jefferson, Lincoln, Washington, to name only a few), scenes of historic import and springtime beauty (Mount Vernon, the Tidal Basin, Arlington National Cemetery), centers of governmental functions (the Capitol Building, Library of Congress, National Archives, and others), and national health, science, art, and foreign affairs centers which only Washington can offer. These will be interspersed by breakfasts and luncheons in the finest of Washington restaurants. Arrangements may be made for visits to the Capitol Building (already included in the ladies' tour), and many suggestions are available for those who may wish to continue sight-seeing, perhaps at the Department of Agriculture Research Center in Beltsville, Maryland, the Smithsonian Institution, the National Institute of Health, the Bureau of Standards, Atomic Energy Commission, the Pentagon, National Art Gallery, National Arboretum, the



Washington Monument

Voice of America Broadcasts, some of the well-known universities, or many, many other sites of interest. Members may wish to plan a trip to Williamsburg, Charlottesville, Gettysburg, or other of the many lovely national parks and shrines in this area.

Washington, D. C. is acknowledged to be one of the world's most beautiful cities, and in the springtime the sight of this beauty is a treasured experience. With a warm welcome we extend an invitation to attend the AACC meeting. The many scientific contributions of the technical sessions, the visit in the Nation's Capital, and the pleasant social activities will make this 44th Annual Meeting one not to be missed and never to be forgotten.

To the Ladies:

Greetings, and a warm welcome to Washington in May.

We hope you will make it to the President's reception on Sunday evening, but by all means, be here bright and early on Monday morning, when we have a bus tour of Arlington and Mount Vernon and a grand luncheon planned for your enjoyment.

Later in the week we shall visit the Capitol, the Smithsonian Institution, the White House, and many other points of interest. There will be breakfasts, luncheons, and free time to tour places of special interest on your own.

Come prepared to have a wonderful time.

BERTHA M. ANZULOVIC

MARIE PANKEY

Lincoln Memorial National Monument

A QUESTION FOR ALL MEMBERS TO PONDER

Can We Be More Effective?

By John A. Johnson, Chairman, AACC Technical Policy Committee*

JOINING OR BANDING together is a common practice that has been highly developed by man. He has found that through union there is strength, and through organization for a common goal, all participants enjoy benefits that cannot be achieved individually. With organization, it is necessary to have well-defined objectives and effective means by which these objectives are achieved. I wish to review for you some proposals being considered by your Technical Policy Committee and your Board of Directors. These proposals relate to making the objectives of our Association serve our membership more effectively.

What We Have Accomplished

The American Association of Cereal Chemists, organized formally in 1915, has had as an objective the establishment of standard methods of procedure in the analysis of cereal products. This is a simple and worthy objective. It has been presumed that through research, publication, and association in annual meetings, standardization of methods of analysis among various laboratories would become automatic. Without formal specification or labeling of the methods of analysis as *standard*, a certain degree of success has been achieved. For example, in the late '20's, the standard error between laboratories of a single determination for protein content was in the neighborhood of 0.25%. Based on analysis of the check sample service data for 1957, the standard error of the same determination was 0.02%. I think you will agree that this improvement is a credit to the members of our Association, particularly when you consider that it was achieved without legislation. Other examples may be also cited. We have raised the precision with which we determine moisture, ash, minerals, vitamins, and other analytical values. As we pause for the moment and review our past accomplishments as an American association of cereal chemists, we rightfully can be proud.

Problems and Proposals

However, we must not be complacent. We must not assume that we have been as effective as it is possible to be, nor that there is no room for improvement, nor that our task is finished. We must acknowledge that there are many areas of our endeavors where improvement can be achieved. It must be admitted that even in those areas where improvement in standardization has been clearly demonstrated, our effectiveness might have been even greater had we been able to say, "These constituents were analyzed according to AACC approved methods." By this means, the entire weight of our Society would be supporting the individual analyst. I dare say that even in a court of law, our methods of analysis would be accepted and recognized.

Though we have acknowledged that there has been good advancement in standardization of methods of analysis, a survey of methodology reveals that many of our members deviate from specified procedures as outlined in *Cereal Laboratory Methods*. This deviation is more serious in some methods of analysis than in others. It is difficult to know or to tell of the many reasons why individuals depart from methods they profess to use. Perhaps the cause for deviation lies in the fact that the methods of analysis outlined in *Cereal Laboratory Methods* hold little official status. Then, too, many of the methods have not been studied extensively enough and thus should be labeled as *tentative*, or in some cases should even be eliminated from the book.

With these many problems facing our Association, your Technical Policy Committee is proposing to review all methods that now appear in the Sixth Edition of *Cereal Laboratory Methods*. An effort will be made to classify all methods of analysis as having *first* or *final approval*. Each of the methods will be assigned to a technical committee. These committees will study the methods and determine whether they can be used widely, and can be expected to give good replication in the hands of the average analyst. The committee will recommend to the Technical Policy Committee that the method be classified as having *first* or *final approval*. If a method is classified as *first*, the committee will continue its study. It will take steps to submit the method for collaborative study. *First* classification may be changed to *final* classification as soon as the technical committee is fully satisfied that the method is reliable. Each method shall be published in CEREAL SCIENCE TODAY and at a forthcoming meeting of our Association presented for *final* classification. Hence, final decision on classification of methods of analysis shall rest with the membership of the Association. Modification of *final approval* may be made only after extensive committee study and convincing evidence that the modification is desirable.

Initiating New Methods

However, there is an even larger

* Address presented to 43rd annual meeting, Cincinnati, Ohio, April, 1958.

field of interest in the development and classification of *new* methods of analysis. As an association of cereal chemists, we must be dynamic if we are to continue to enjoy growth and gain further respect for our profession. We must be ready at all times to investigate and possibly give our stamp of approval to new methods. To this end, we hope that each member will cooperate by proposing new methods for study by the technical committees and that, when he is called upon to engage in technical committee activity, he will take the lead and drive on, tirelessly, until the objective has been completed.

The steps required to have a new method adopted by the Association would be essentially the same as those outlined for existing methods. When a new method appears in our Association periodicals, or when some member presents one to the Technical Policy Committee, it will be assigned to a technical committee for study. On the basis of the committee's recommendation, the new method will be classified as having *first* or *final approval*, and will be publicized in the same manner as for older methods.

When we are able to carry out the methods classification program which I have outlined, I would propose that the Association provide for you a rubber stamp. This stamp would bear our Association Seal and words to the effect that these analyses were performed according to the AACC approved methods. This would serve to bind us together in a stronger alliance, and the Association would thus lend its support to us in a really tangible way.

Revision Committee

In order that classification of methods be effectively associated with *Cereal Laboratory Methods*, which should be the guide for all cereal analysts , your Technical Policy Committee proposes that the revision be done by a committee responsible directly to the Technical Policy Committee. It is proposed that this revision committee be charged with the responsibility of maintaining a current, valid, and up-to-date methods book. The committee members shall assume responsibility to place in the revision such changes as may be recommended by the Technical Policy Committee. They shall assume major responsibility for editing the book. It is proposed that this committee be established for a five-year period, or until such time as their responsibilities have been satisfactorily discharged. Majel M. MacMasters has accepted the chairmanship of the Revision Committee.

Technical Committee Work

I wish to take this opportunity to commend several of our technical committees for the fine work which they have been doing. I express the hearty thanks of our Association:

To the Soybean Analysis Committee under L. R. Brown; the method for analysis of urease in heated soybean meal recently published in CEREAL SCIENCE TODAY will find its useful place;

For the continued fine work of our check sample service under Lester Fischer; because of this service, our interlaboratory error for common analytical determinations is growing smaller;

To the members of the Farinograph Standardization Committee, under Max Milner, who are beginning to bring order out of chaos;

To the Feedstuff Analysis Committee, under Max Cooley, for their honest attempts to meet the analytical problems of the feed industry;

To the Vitamin and Mineral Analysis Committee, under Welker Bechtel, whose work has produced an approved method for thiamine analysis of cereal products; and to many of the other committees who have functioned during the past few years.

Pulling Together

I hasten to point out that much of the technical committee work is fraught with difficulties. These difficulties are not so much in the nature of the problems as with personnel. Frequently chairmen of technical committees fail to get organized and outline the specific objectives of their committees. There is some difficulty associated with the inability of our members to share their experiences. None of us has methods of analysis that are trade secrets, and progress is impeded when we do not share this knowledge with our fellow-workers.

I am sure that many of us feel the necessity of pulling together to improve our value to our company and to raise the respect of our industries for our professional competence. Each and every one of us will serve to benefit by this enhanced respect which the public and employer might have for our service. As we make ourselves more effective, we should find a general upgrading of salaries and economic well-being. Individually, we can feel the satisfaction of a job well done. So I urge each of you to aid our technical work. Join in and put your shoulder to the task of bringing better agreement on analysis and thereby promoting your own professional competence.

NEW AACC MEMBERS

Barnett, James C., St. Louis, Missouri.
Batdorf, Jack B., Wilmington, Delaware.
Brink, Robert C., Ft. Thomas, Kentucky.
Elton, George A. H., Chorleywood, Herts., England.
Fernandez-Vina Gomez, Antonio, Santiago de Cuba, Cuba.
Fischer, Arthur P., Minneapolis, Minnesota.
Forsythe, Richard H., Springfield, Missouri.
Friesen, Edward K., Calgary, Alberta, Canada.
Fudge, Charles S., Wilkes-Barre, Pennsylvania.
Goodwin, John T., Jr., Washington, D.C.
Gourley, Charles O., Cayuga, New York.
Griffin, Edward L., Jr., Peoria, Illinois.
Hansen, Christian Carl, Philadelphia, Pennsylvania.
Hawryluk, Michael L., Saskatoon, Sask., Canada.
Holt, Roland, Bolton, England.
Hooper, Donald J., Port Credit, Ontario, Canada.
Houston, David F., Albany, California.
Hughes, Stuart B., Barrington, Illinois.
Keng, C. T., Hong Kong.
Kichline, Thomas P., St. Louis, Missouri.
Korol, Michael A., Windsor, Ontario, Canada.
Landon, Merton A., Temple City, California.
Lawrence, James F., Minneapolis, Minnesota.
Lipschultz, Melvin, Chicago, Illinois.
MacMillan, Joseph E., Atlanta, Georgia.
Masuoka, Yoshito Wm., Chicago, Illinois.
Matsumoto, Hiroshi, Osaka, Japan.
McClure, John R., Chattanooga, Tennessee.
McFadden, L. Rex, Denton, Texas.
Meagher, William R., Columbus, Ohio.
Mruk, Jerome A., Buffalo, New York.
Oesting, Ralph B., Chicago, Illinois.
Parkhurst, Raymond T., Roanoke, Virginia.
Roshone, J. D., Cincinnati, Ohio.
Schuler, Martin N., Kansas City, Missouri.
Shaughnessy, Thomas F., Alton, Illinois.
Shieh, Skipper T. R., Chicago, Illinois.
Stone, Charles D., Tallahassee, Florida.
Swanson, George D., Long Island City 1, New York.
Tillott, John C., Tamworth, N.S.W., Australia.
Ulrich, Walter E., Jr., Evansville, Indiana.
Weir, C. Edith, Chicago, Illinois.
West, Dwight B., Chicago, Illinois.
Wilson, Jack T., Wooster, Ohio.
Wolf, Michael J., Peoria, Illinois.

The abstracts below are from papers that will appear in the March issue of Cereal Chemistry, Vol. 36, No. 2, 1959.

PREVIEWS from CEREAL CHEMISTRY

Effects of Sulfhydryl-Blocking Reagents on the Mixing Characteristics of Doughs—D. K. Mecham.

Explaining the differences in dough-mixing characteristics of various flours continues to be one of the greatest challenges to the cereal chemist's abilities. In this paper from the Western Utilization Research & Development Division of the U.S. Department of Agriculture, the author describes changes in mixing behavior when N-ethylmaleimide, p-chloromercuribenzoate, iodoacetamide, potassium iodate and sodium chlorite were added to flour. Time to maximum resistance was decreased, maximum resistance was increased slightly, and rate of breakdown was greatly increased. The discussion relates these data to other published work.

• • •

The Estimation of Starch Paste Fluidities—W. R. Fetzer and L. C. Kirst.

This contribution from the Clinton Corn Processing Co., a division of Standard Brands, Inc., presents a new alkaline paste procedure suitable for describing both acid-modified and oxidized starches. The authors propose a method of nomenclature for identification of starches by their fluidity characteristics. They also have worked out a table to correct fluidities to a common basis over a starch moisture range from 8 to 15%. Data are given from tests with several types of starch.

• • •

A Note on the Radioactivity Distribution in Milling Products of Thatcher Wheat Grown in the Presence of Strontium-90 — C. C. Lee.

Distribution of strontium-90 radioactivity in milling products of wheat was found to be correlated with ash content. Work was supported by the Saskatchewan Research Council and the Saskatchewan Agricultural Research Foundation.

• • •

A Simple Method for Determining the Protein Content of Wheat and Flour Samples — Louis Feinstein and Joe R. Hart.

From two U.S. Department of Agriculture chemists at Beltsville, Md., comes a quick, simple method for determining protein content with a fair degree of accuracy. A sample of ground wheat or flour is extracted with dilute alkali. When the extract is reacted with sulfosalicylic acid, a turbidity is produced that may be determined by a photoelectric colorimeter and is highly correlated with protein content.

• • •

Effect of Temperature on the Kinetics of the Lipoxidase System of Wheat—G. N. Irvine.

From Canada's Grain Research Laboratory at Winnipeg comes this report on the kinetics of linoleic acid by lipoxidase from wheat.

• • •

Grain Storage Studies. XXVIII. The Inorganic Phosphorus Content of Deteriorating Wheat—R. L. Glass and W. F. Geddes.

Deteriorating wheat was found to exhibit an increase in inorganic phosphorus content, which was greater with increasing temperatures and moisture contents. The authors believe the change results from the action of wheat phytase upon phytic acid. They suggest that inorganic phosphorus level may be a useful index of previous storage conditions and of future storage behavior. The work reported was done in the Department of Agricultural Biochemistry at the University of Minnesota.

• • •

Further Studies on the Determination of Sulfhydryl Groups in Wheat Flours—H. A. Sokol, D. K. Mecham and J. W. Pence.

These workers at the Western Utilization Research & Development Division, U.S. Department of Agriculture, have refined the methods they have developed for determining sulfhydryl content of wheat flours. Procedure requires (a) dispersion at 2°C. (b) in 6 to 8 M urea and (c) use of ethylenediaminetetraacetate to minimize effect of interfering metallic ions. Sulfhydryl contents of flours tested ranged from 0.66 to 1.30 microequiv. per g.

The Polarographic Determination of Cystine in Wheat and Flour Hydrolysates—Werner F. Daum, John E. DeVries, and Byron S. Miller.

At Kansas State College an improved method was developed for the polarographic determination of cystine in wheat and flour hydrolysates. Results show close agreement with data obtained by chemical and microbiological methods which are more difficult to carry out.

• • •

A Note on Methods of Dispersing Fifty-Percent Amylose Corn Starch — J. W. Sloan, Majel M. MacMasters, and F. R. Senti.

Corn starch with an amylose content of 50% is becoming available. Its granules are highly resistant to dispersion in aqueous media. This paper, from the Northern Utilization Res. & Development Division, US Dept. of Agriculture, describes and compares several methods of accomplishing such dispersion.

• • •

Preservation of Rough Rice by Cold Storage—D. F. Houston, R. E. Ferrel, I. R. Hunter, and E. B. Kester.

In this contribution from the Western Utilization Research & Development Division results are reported on the changes in samples of rough rice stored for three years at four moisture contents and three temperatures ranging from 34°F. to –20°F. Data show that experimental reference materials can be suitably held for extended periods.

• • •

A Lean Formula Cake Method for Varietal Evaluation and Research—Leo T. Kissell.

The Soft Wheat Quality Laboratory at Wooster, Ohio, has developed and is using a simplified cake test for evaluation of wheat varieties. All structure-producing ingredients except patent flour are excluded from the formula. Replication error is small and good agreement between labs is possible.

PRELIMINARY PROGRAM

44th

ANNUAL MEETING

☆ ☆ ☆

AMERICAN ASSOCIATION OF CEREAL CHEMISTS

May 3-7, 1959

STATLER-HILTON HOTEL • WASHINGTON, D. C.

GENERAL PROGRAM

Sunday, May 3

Registration
2:00 p.m.–8:30 p.m. Upper Lobby

Editorial Board Meeting
1:00 p.m. Massachusetts Room

Board of Directors Meeting
2:00 p.m. Michigan Room

Technical Policy Committee Meeting
4:00 p.m. Massachusetts Room

President's Reception
7:00 p.m. Presidential Ballroom

Monday, May 4

Registration
8:00 a.m. Upper Lobby

Exhibits
9:00 a.m. Upper Capitol Terrace, Foyer 2, and Foyer 3

Opening Session
9:30 a.m. Congressional Room

Technical Session
1:30 p.m. Congressional Room

Tuesday, May 5

Registration
9:00 a.m. Upper Lobby

Exhibits
9:00 a.m.

Annual Business Meeting
11:00 a.m. Congressional Room

Technical Sessions
9:00 a.m. Concurrent Sessions

Technical Committee Meetings
1:00–2:00 p.m. Open Session
2:00–5:00 p.m. Closed Committee Meetings

Wednesday, May 6

Registration
9:00 a.m. Upper Lobby

Exhibits
9:00 a.m.

Technical Sessions
9:00 a.m. Concurrent Sessions — Federal Room and South American Room
1:30 p.m. Concurrent Sessions — Federal Room and South American Room

National and Section Officers Luncheon
12:15 p.m.

Cocktail Party
6:00 p.m. Congressional Room

Banquet and Dance
7:00 p.m. Presidential Ballroom

Thursday, May 7

Registration
9:00–11:00 a.m. Upper Lobby

Exhibits
9:00 a.m.

Technical Sessions
9:00 a.m. Concurrent Sessions — Federal Room and South American Room
1:30 p.m. Concurrent Sessions — Federal Room and South American Room

Board of Directors Luncheon
12:15 p.m. Massachusetts Room

Final Business Session
4:00 p.m. Federal Room

LADIES' PROGRAM

Sunday, May 3

2:00 p.m. Hospitality Room opens — California Room
7:00 p.m. President's Reception — Presidential Ballroom

Monday, May 4

8:00 a.m. Hospitality — California Room
8:00 a.m. Continental Breakfast (courtesy of Sterwin Chemicals, Inc.) and Get-Acquainted Period — California Room
10:00 a.m. Tour to Mount Vernon with stops at Lincoln Memorial, Arlington Cemetery, and other points of interest. Leave from 16th St. entrance, Hotel Statler
1:15 p.m. Luncheon at Collingwood-on-the-Potomac (courtesy Wallace & Tiernan, Inc.)
3:15 p.m. Return to Hotel Statler

Tuesday, May 5

8:00 a.m. Hospitality — California Room
8:00 a.m. Continental Breakfast
9:30 a.m. Capital Tour — includes Archives Building, National Art Gallery, Supreme Court Building, Library of Congress, Bureau of Standards, Smithsonian Institution, Capitol Rotunda, Senate Gallery
12:30 p.m. Luncheon at Hotel Statler (courtesy Merck & Co., Inc.)
(No activities scheduled for the remainder of the day)

Wednesday, May 6

8:00 a.m. Hospitality — California Room
8:00 a.m. Continental Breakfast
12:00 noon Luncheon at Columbia Country Club, Chevy Chase, Maryland (courtesy of Durkee's Famous Foods)
Post-luncheon tour of Islamic Center and selected Embassies
Early return to hotel

Thursday, May 7

8:00 a.m. Hospitality — California Room
9:15 a.m. Open for possible visit to White House
(No activities scheduled for the remainder of the day)

TECHNICAL PROGRAM PAPERS

Current Trends in Fundamental Research as Related to Cereal Chemistry

Characterization of the Useful Properties of Starch
A. L. ELDER and T. J. SCHOCH

Current Investigations of the Role of Lipids in Baking
ROBERT L. GLASS

The Control of Enzyme Biosynthesis in Microorganisms
HARLYN O. HALVERSON

Current Trends in Lipid, Protein, and Related Nutrition Research
CHARLES G. KING

New Techniques in Protein Chemistry and Their Application to Cereal Protein Research
EDWIN T. MERTZ

Baking and Bakery Products

Technology of the Continuous Bread Process
K. L. FORTMANN

The Dough Mixing Behavior of Gluten and Other Flour Fractions Treated with Sulfhydryl-Blocking Agents
D. K. MECHAM, H. A. SOKOL, and J. W. PENCE

The Relationship of Types of Phosphorus in Wheat Flour and Gluten to Flour Quality
C. A. WATSON, B. S. MILLER, and J. A. JOHNSON

Some Volatile Aromatic Compounds in Fresh Bread
L. WISEBLATT

A Comparative Study of Several Factors Influencing the Course of Fermentation Under Three Systems of Bread Production
C. S. STONE and E. G. BAYFIELD

The Effect of Flour Lipids and Some Lipid Derivatives on Cookie Baking Characteristics of Lipid-Free Flours
E. W. COLE, D. K. MECHAM, and J. W. PENCE

Changes in Sulfhydryl Content of Wheat Flour Doughs During Mixing
H. A. SOKOL, D. K. MECHAM, and J. W. PENCE

The Role of Lipids in the Deterioration of Wheat Flour during Storage
J. NELSON, R. L. GLASS, and W. F. GEDDES

Studies on Active Dry Yeast in Breadmaking
J. G. PONTE, JR., ROBERT L. GLASS, and W. F. GEDDES

Determination of Yeasts in Doughs
J. A. THORN and J. W. ROSS

Effect of Freezing, Defrosting, and Storage Conditions on the Freshness of Dinner Rolls and Cinnamon Rolls
K. KULP and W. G. BECHTEL

Correlation between Baking Value of Flour and the Uniform Elongation Limit of Dough Specimens
I. T. RADA

Titles to be announced:
HOLGER JORGENSEN
ANTONIO QUINTANA-MARI

The Food and Drug Administration and Cereal Chemistry

Field Applications of the F.D.C. Act
FRANKLIN D. CLARK

Radioactive Contamination of Grain and Grain Products
EDWIN P. LAUG

The Adequacy of Food Additives Toxicity Studies
ARNOLD J. LEHMAN

Practical Aspects of Grain and Cereal Testing

A Review of Methods of Measuring Wheat Gluten Quality
FRED SCHMALZ

Sponge Dough Versus Straight Dough Bake for Gluten Quality Evaluation in the Laboratory
E. J. STONE

Methods of Evaluating Flour Strength
G. N. IRVINE

Intercomparison of Farinograph Absorption Obtained with Different Instruments and Bowls
I. HLYNKA

Stability Tests on Cereal Products by the Oxygen Bomb Method
P. E. RAMSTAD

A Simple Procedure for Determination of Flour Particle Size by Air Separation
F. W. WICHSER

A Method for the Determination of Percent Starch Damage in Flour
R. M. SANDSTEDT

A Review of Recent Modifications in the Study of Insect Contamination in Cereal Products
KENTON L. HARRIS and O. L. KURTZ

Sedimentation Value as an Index of Mixing Tolerance in Early-Generation Wheat Selections
LAWRENCE ZELENY

Grain Structure and Grain Constituents

Composition of Cementing Layer and Cell Walls of Corn as Related to Germ-Endosperm Separation
H. L. SECKINGER, M. J. WOLF, and MAJEL M. MACMASTERS

Effect of Fats and Surface-Active Agents on Starch Pastes
ELIZABETH M. OSMAN and MARION R. DIX

Pyrodextrinization Reaction Patterns
R. B. EVANS and O. B. WURZBURG

Preparation and Properties of Hydroxypropylated Wheat Flour
S. M. SCHWARTZ, C. R. RUSSELL, and F. R. SENTI

Preparation and Properties of Hydroxyethylated High-Amylose Corn Starch
J. C. RANKIN, J. G. RALL, C. R. RUSSELL, and F. R. SENTI

The Wet-Milling Industry

Wet-Milling High-Amylose Corn Having Starch of 50 to 60 Percent Amylose Content
R. A. Anderson, C. Vojnovich, and E. L. Griffin

The Formation of Starch in Wheat Grain
Roy L. Whistler and J. R. Young

Experimental Evidences of a Critical Concentration for Gel Formation in Corn Starch Pastes
Raymond R. Myers, Carl Knauss, Jr., and A. C. Zettlemoyer

Origin of Fragments of Contamination in Cereal Products

Introductory Remarks
W. H. Schoenherr

Contamination during and after Processing
G. B. Wagner

Contamination in Transit and in Terminal Storage
Paul McSpadden

Contamination in Flat Storage, Country Elevator, Farm Bin, and Field
L. S. Henderson

Possible Sources of Contamination of Rodent and Bird Origin
W. W. Dykstra

Grain Drying

Harvesting and Conditioning High-Moisture Wheat
W. H. Johnson and K. A. Harkness

Farm Practices of Drying Grain
H. J. Barre

Grain Drying Rates
W. V. Hukill

Evaluating the Effects of Mechanical Drying on Grain
Robert A. Saul

Cereals in Foods

Gel Properties of Common and Waxy Corn Starches
Louis A. Wollermann

Some Applications of Starch in Kroger Processed Foods
Norbert H. Volle

Experimental Milling Procedures
Ben Grogg

Evaluation of "Spot" Samples of the 1951 Crop Year
Ben Grogg

Chemicals from Cereals by Microorganisms

Microbial Polymers
Ralph Anderson

Fermentation Acids
Fred Tanner, Jr.

The Production of Vitamins by Fermentation
Austin M. Hanson

Antibiotics
Ping Shu and Marjorie Darken

Grain and Milling Technology

Rye and Rye Milling
H. H. Schopmeyer

The Story of Oatmeal
S. F. Brockington

Barley — Current Trends in Production and Utilization
Eric Kneen

Soybean and Soybean Products: Production and Processing
R. L. Terrill

Rice in the United States
Robert R. Mickus

Cereals in Feeds

Sampling Techniques and Suggestions for Better Feed Quality Control
A. B. Poundstone

Statistical Quality Control Applied to Everyday Feed Manufacturing Operations
Walter A. Glista

Influence of Pelleting Operations on Micro Ingredients in Manufactured Feeds
Robert C. Wornick

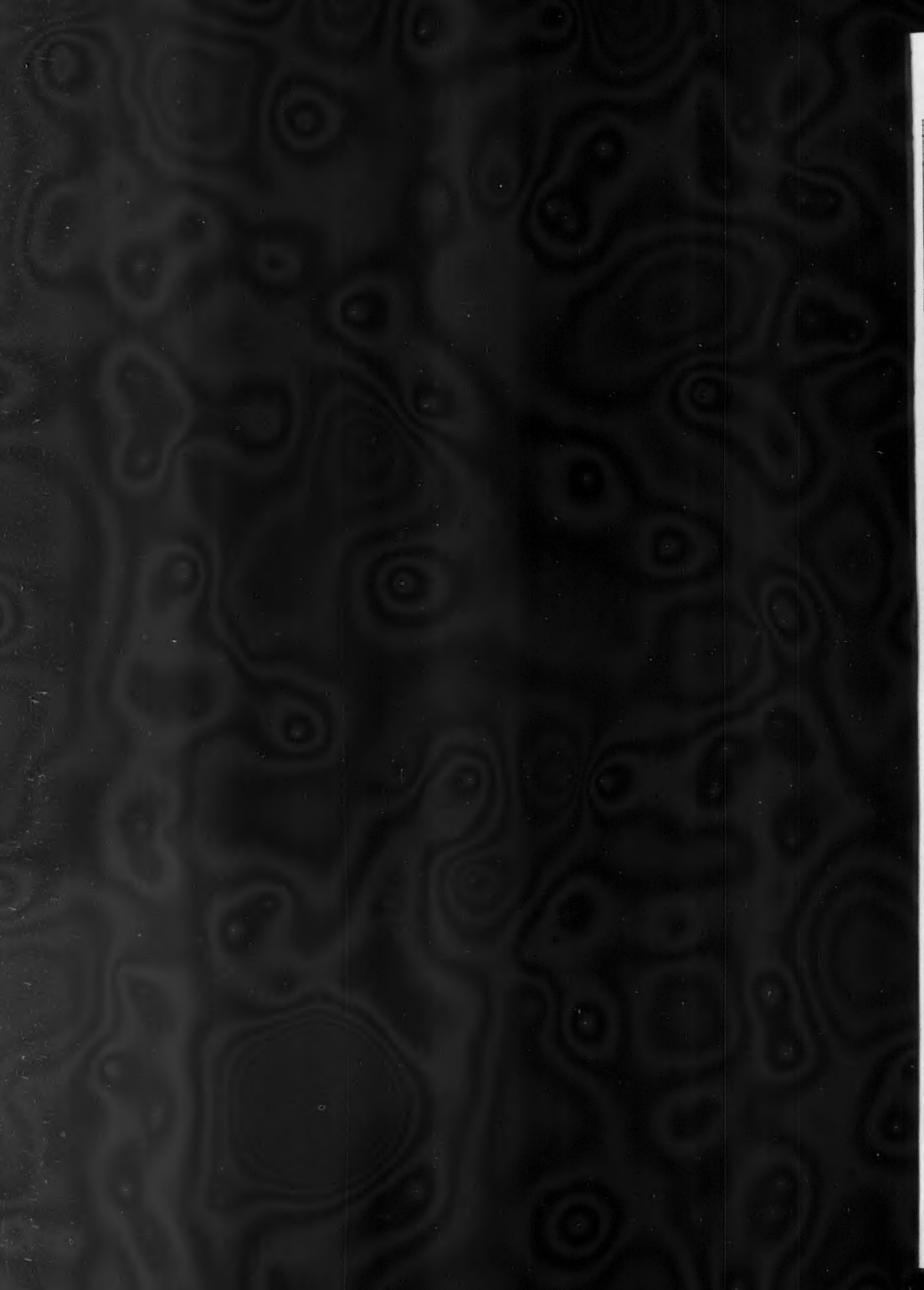
Miscellaneous

The Effect of Heat on Batters. II. Photographic Record of Protein Level-Batter Structure Relationship
R. C. A. Bradshaw

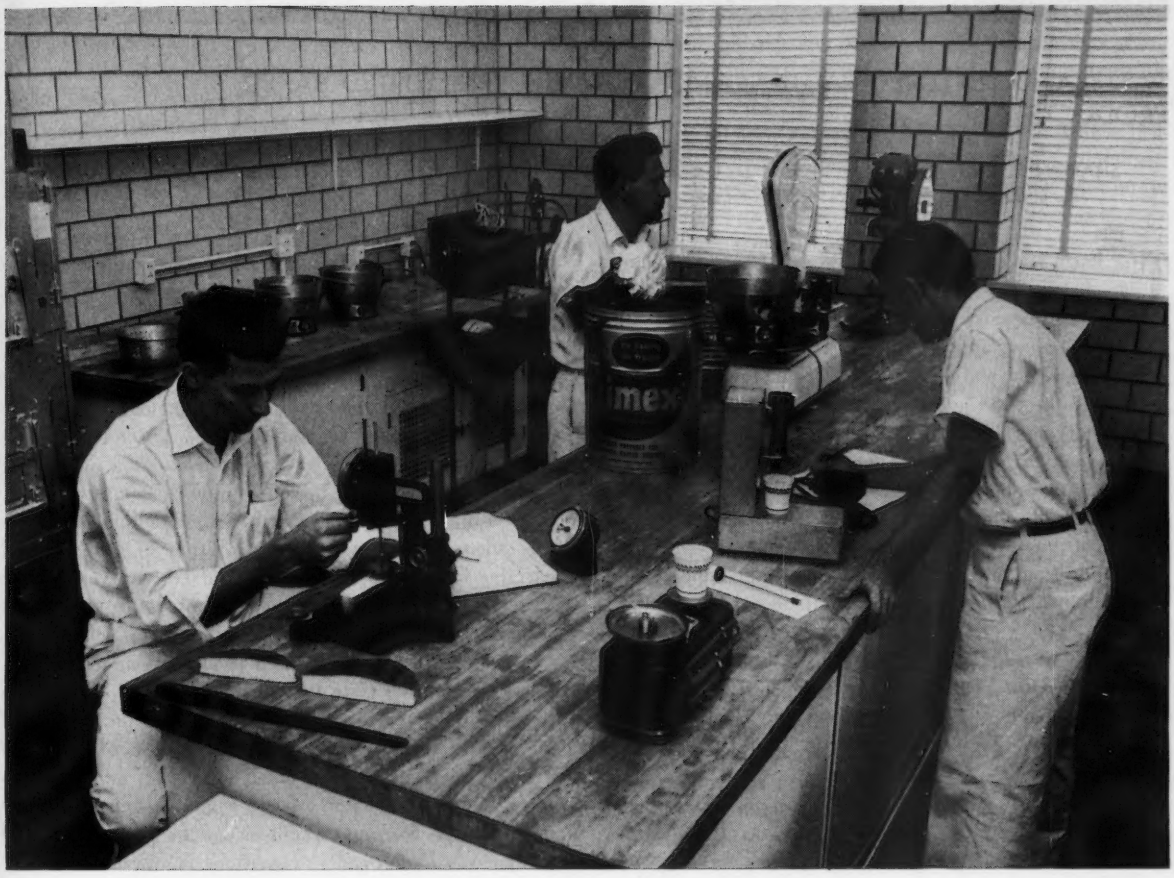
The Baker's Problem in Testing Flour
J. G. Ponte, Jr., E. L. Von Eschen, D. B. Davis, S. Titcomb, F. W. Pfizenmayer, and R. H. Cotton

Rapid Methods for Determining Smut Content of Wheat
Robert M. Johnson

A Method and Machine for Detection of Living Internal Insect Infestation of Grains
Norman M. Dennis and Robert W. Decker



A corner of one of the famous Procter & Gamble laboratories at Ivorydale, Ohio.
At P & G, product improvement goes hand in hand with the developments of science.



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TASTE AND TEXTURE EVALUATION OF LYSINE-SUPPLEMENTED BAKED PRODUCTS

SHARON R. EHLE, N. L. HAUSE, and D. E. PAUL, Research Division, Electrochemicals Department, E. I. du Pont de Nemours and Company, Inc.

THE FACT THAT the protein quality of bread and flour can be markedly improved by supplemental lysine has been demonstrated by many workers[1] (3,7,8,9,10, 11,12). A dietary supplement will win acceptance by the public, however, only if it does not appreciably alter or change the taste and appearance of the product. The "consumer appeal" qualities of baked products fortified with lysine[2] have had little attention. Lysine, in addition to being an essential nutritive factor, shares a property common to all amino acids in that it has a slight taste. It was of interest, therefore, to evaluate the effects of lysine addition on such qualities as taste, appearance, grain, texture, staling rate, and volume in baked products.

Materials and Methods

Food Preparations. Breads were prepared by a sponge and dough method using a 60% sponge. The formulas for the two types tested are given in Table I.

TABLE I
FORMULAS FOR BAKED PRODUCTS

INGREDIENT	WHITE BREAD		CAKE		DOUGHNUTS
	Standard	Sweet	Yellow	Chocolate.	
	g	g	g	g	g
Bread flour	100.0	100.0	....	....	....
All-purpose flour	....	....	100.0	100.0	100.0
Lysine monohydrochloride	.... [a]	.... [a]	0.5	0.5	.... [a]
Water	60.0	55.0	....	....	....
Salt (CP NaCl)	2.0	2.0	3.0	1.3	2.1
Shortening, hydrogenated vegetable	4.0	8.0	....	....	3.3
Butter	....	....	12.0	60.0	....
Yeast	2.0	2.0	....	....	....
Yeast food	0.4	0.4	....	....	....
Sugar, granulated	6.0	12.0	174.0	80.0	63.5
Sugar, brown	....	....	....	60.0	....
Nonfat dry milk	2.0	4.0	....	....	7.1
Baking soda	....	....	....	2.0	....
Baking powder	....	....	5.0	....	2.9
Whole milk	....	....	70.0	120.0	....
Whole eggs	....	....	87.0	60.0	31.8
Chocolate	....	....	....	45.0	....
Vanilla extract	....	....	5.0	2.0	1.5
Cinnamon, ground	....	....	....	....	0.5
Nutmeg, ground	....	....	....	....	0.3

[a] Variable.

Sponges and doughs were mixed in a 10-qt. Hobart laboratory mixer with a dough hook. Sponges were fermented 3.5 hours at 80°F. and 85% relative humidity. A sheeting roll and a three-roll molder were used to sheet and mold the doughs which were subsequently proofed for 1 hour at 96°F. and 95% relative humidity. Standard white and sweet white breads were baked in a rotating plate oven for 25 minutes at 450°F. and for 35 minutes at 375°F., respectively. When cool, all loaves were sealed in cellophane. Taste evaluations were made within 24 hours after baking.

Yellow and chocolate cakes were prepared according to formulas given in Table I. Prior to panning, each batter was divided into two equal portions, and 1 or 2 ml. of distilled water containing the calculated amount of lysine was added to one of these portions. An equal quantity of distilled water was added to the other. The respective batters were mixed 2 minutes longer and then panned and baked. To determine whether this procedure was adequate for uniform distribution of the lysine, a carmine food color was similarly mixed with yellow cake batter. The color was evenly distributed throughout the cake.

The doughnut formula used is also given in Table I. To determine the taste threshold concentration of lysine in doughnuts, care was taken to ensure uniformity of all factors that contributed to the flavor of the final product. Special care was taken so that no minute variations in the proportion of the highly aromatic components of the formula would occur to prevent a valid comparison of the panel evaluations from one day to the next. To accomplish this, the dry ingredients for the entire series of tests were thoroughly mixed and sealed in an air-tight container. Weighed portions of this mixture were subsequently used for preparation of fresh samples. Enough eggs for the entire series of tests were homogenized and frozen in polyethylene containers in weighed portions for each batch. The calculated amounts of lysine were dissolved in the prescribed quantity of water, and the batters were mixed at medium speed in the Hobart K-5A Mixer for 30 seconds at 77°F. The doughnuts were extruded from the molder into a deep-fat fryer and cooked 1.5 minutes per side at 360°F.

Taste Testing. Panel members had not previously participated in food evaluations. A preliminary series of tests on the taste of aqueous solutions of lysine monohydrochloride was made to make them familiar with both the procedures involved and the taste of lysine. The triangular method introduced by Bengtsson and Helm (2) was used to establish taste differences.

A series of typical white breads varying in lysine concentration was prepared. The fortified bread samples were randomly distributed among pairs of unfortified controls, and two or three of these sets were presented to the panel during a session. The panelists were instructed to select the "different" sample and describe the taste difference. Preliminary sessions indicated that some of

[1] Brown, J. W., Flodin, N. W., Gray, E., and Paynter, E. (To be published.)
[2] L-lysine monohydrochloride was used throughout this investigation.

the judges had an inherent tendency to make sample selections on the basis of size alone. Only portions of uniform size, therefore, were presented in subsequent tests. Taste differences and threshold concentrations of lysine in sweet white breads and doughnuts were similarly determined. Data typical of those obtained with the use of the triangular method are presented for lysine-fortified doughnuts in Table II.

TABLE II

TASTE EVALUATION OF LYSINE-SUPPLEMENTED DOUGHNUTS (Triangular Test)

LMH IN DOUGHNUTS	No. OF TASTERS	No. CORRECT	PERCENT IDENTIFICATION [a] ABOVE CHANCE	"P" SIGNIFICANCE LEVELS
g/100 g flour			%	
0.25	18	7	3 [b]	>0.500
0.50	18	10	33	0.080
1.00	18	11	41	0.035
2.50	25	18	58	<0.001
5.00	25	21	76	<0.001

[a] Percent identification above chance $= 100/(1-\overline{P})\ (P-\overline{P})$ where $\overline{P}$ is the fraction expected by chance alone (when no difference between controls and treatment exists) and P = fraction of taste panel identifying treatment correctly.

[b] Percent identification above chance values ≤10% were not used in obtaining the least squares line in the graphical analysis of the data.

Threshold concentrations of lysine in the baked products were determined by an analysis of the taste-difference data using the method of Harrison and Elder (6). The taste threshold concentration is defined as that concentration of a flavor which can just be detected 50% of the time (5). It was determined in breads and doughnuts from graphs of the data. A typical graph of such data is shown in Fig. 1.

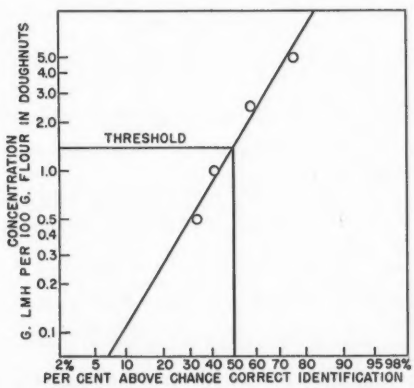

Fig. 1. Taste-threshold determination of lysine monohydrochloride (LMH) in doughnuts.

In testing cakes, panel members were given only two samples: the control and the lysine-fortified product. They were instructed to rate the samples on over-all quality by indicating their preference on a hedonic scale using the terms: strong preference, moderate preference, slight preference, and no preference. General appearance, taste, and eating quality were given equal importance in the evaluation.

Texture and Appearance Tests. The effect of lysine on the staling rate of a standard white bread formula was evaluated. A Baker Compressimeter was used to measure the increase in firmness, which is a characteristic of staling. Eight or nine slices 1.40 cm. thick were cut and oriented with the curved portion (top) away from the operator. The plunger was positioned on the crumb at one-third the distance from the top and equidistant from the sides each time a measurement was made. Compressimeter readings were taken at approximately 24-hour intervals, and the bread was stored in insulated containers during the interim. The compressimeter plunger was 36 mm. in diameter, and the force (in g.) required to compress the bread 2.5 mm. was measured.

Loaf volume measurements were obtained using a National Loaf Volumeter which is calibrated in cubic centimeters for the displacement of rapeseed. The procedure outlined by the manufacturer for the use of the instrument was followed in making the measurements (1).

Crust color was scored on an arbitrary scale of 5. The crust color of the standard unfortified loaf, a golden brown, was assigned a rank of 5, and fortified loaves were graded, side by side, by visual comparison. Crust colors approaching the shade of mahogany were given the score of zero.

Results and Discussion

In evaluating lysine-fortified breads, attempts were made to secure data on samples which closely resembled the typical commercial products. The taste threshold concentration was determined in both standard white and sweet white breads. The taste-threshold concentration of lysine in both types of bread was reached at approximately 0.5 g. lysine monohydrochloride per 100 g. of flour. This concentration is double the nutritionally optimum level of supplementation (10).

Galvin (4) has reported that lysine resembles glutamic acid in taste. The majority of the panel members described the taste as salty, bitter, or as an after-taste. The taste of lysine at threshold concentrations in bread is detected principally in the crust; this crust taste probably influenced the descriptive terms used by our panel. At the recommended supplementation level (10), no significant differences between fortified and unfortified loaves in either crust or crumb taste were observed.

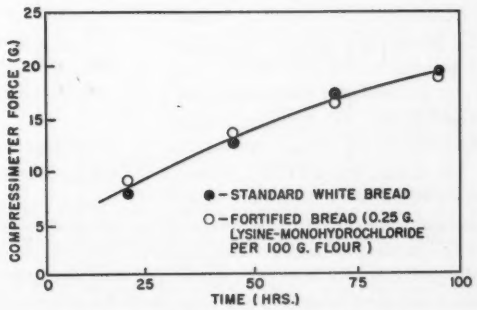

Fig. 2. Rate of crumb firmness change.

As is shown by the curves in Fig. 2, lysine (0.25 g.

lysine monohydrochloride per 100 g. flour) had no effect on the rate of change in crumb firmness in the bread.

The data in Table III show that the changes in lysine concentration do not significantly affect the loaf volume of sweet white bread. Tests carried out in a commercial bakery have also shown that lysine at the recommended levels of supplementation does not affect the loaf volume of standard white breads.

TABLE III

VARIATION OF LOAF VOLUME WITH ADDED LYSINE IN SWEET WHITE BREAD

LMH IN BREAD	LOAF VOLUME
g/100 g flour	*cc*
0.00	2212
0.10	2000
0.20	2158
0.25	2032
0.50	2000
2.00	2068

Crust browning increases with increasing lysine concentration (Fig. 3). Even at nutritionally optimum concentrations, a greater browning of the crust was observed with the fortified loaf; however, slightly longer time and lower temperature during baking gave lysine-fortified loaves with normal taste, texture, and the desired degree of browning.

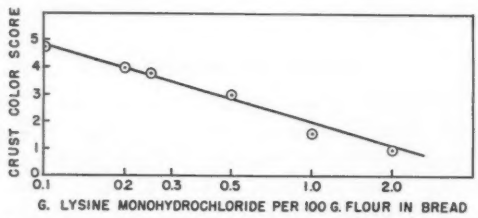

Fig. 3. Crust color variation in lysine-supplemented breads.

TABLE IV

TASTE EVALUATION OF LYSINE-FORTIFIED[a] CAKES

SAMPLE	DEGREE OF PREFERENCE	WEIGHTED SCORE[b]	TOTAL NO. OF PREFERENCES	PERCENT ABOVE CHANCE[c]
		av		
Lysine-fortified[a] yellow cake vs. control	10 slight, 6 moderate 1 strong	1.47	17	6%
	9 no preference			
	8 slight, 4 moderate, 2 strong	1.57	14	
Lysine-fortified[a] chocolate cake vs. control	4 slight, 1 moderate, 1 strong	1.50	6	Negative
	8 no preference			
	5 slight, 4 moderate, 0 strong	1.44	9	

[a] Fortified cakes contained 0.5 g. LMH per 100 g. flour.

[b] This score is obtained by assigning the numerical values of 1, 2, and 3 to the terms slight, moderate, and strong, respectively; multiplying these values by the number of people using each term; and dividing the sum of these figures by the total number of people preferring the sample.

[c] Percent above chance $= 100/(1 - \bar{P})\ (P - \bar{P})$ when $\bar{P}$ = the fraction "expected" by chance alone (when no difference between the control and treatment exists) and P = fraction of taste panel identifying treatment correctly.

The taste-threshold concentration of lysine in doughnuts is not reached until concentrations of approximately 1.4 g. lysine monohydrochloride per 100 g. flour are attained. This concentration is more than five times the nutritionally optimum level of supplementation of 0.25 g. lysine monohydrochloride per 100 g. of flour (10). No effects on the volume or color of the doughnuts were noted at the 0.25-g. level of supplementation. Only at very high levels (2.5 and 5 g. per 100 g. flour) was increased browning and poor texture observed in doughnuts.

Summary

No off-flavor resulted from the addition of nutritionally optimum amounts of L-lysine monohydrochloride to breads, cakes, and doughnuts. The only physical property altered by these additions was crust color of breads. Although the crust was slightly darker for the lysine-fortified breads baked under the standard set of conditions used in these tests, the desired degree of browning was obtained by appropriate adjustments in baking temperature and time without affecting other properties.

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BOOK reviews

Advances in Food Research, vol. 8, ed. by E. M. Mrak and G. F. Stewart. Academic Press, Inc., New York and London, 1958. Price, $12.00. Reviewed by R. A. LARSEN, The Pillsbury Company, Minneapolis, Minnesota.

It might be appropriate to begin this review by paraphrasing the writings of Scott Blair, who talks about rheology on page 56 of this book. His statements could be applied equally well to food research.

Food science may still be regarded by some as a "messy" science, partly by reason of the nature of its materials but partly, no doubt, because of the lack of clear theory. The latter criticism must be faced and the situation improved. With regard to the former, we cannot do better than close with the story of Parmenides (which is quoted from Scott Blair, 1949).

"Parmenides (if Plato quotes him rightly) saw the dangers of highbrow philosophy. As an old man, interviewing Socrates about the theory of forms, he asked the young philosopher whether he was interested in 'hair or mud or dust or any other trivial or undignified objects,' and when Socrates replied that he occupied his time in thinking of more sublime things, Parmenides answered: 'That is because you are still young, Socrates, and philosophy has not yet taken hold of you so firmly as I believe it will some day. You will not despise any of these objects then."

Advances in Food Research could be considered by some as treating a "messy" field. I'm sure, however, that the arrival of the eighth volume finds this opinion changing. Food research is dealing rather with a complicated field. Certainly there is lack of clear theory, but also certainly the situation is improving and publications such as this have been instrumental in its improvement.

Six subjects are treated: 1, "Rheology in food research," by G. W. Scott Blair; 2, "The blanching process," by Frank A. Lee; 3. "New methods to detect and eliminate insect-infected grain," by Max Milner; 4, "Composition of wines. II. Inorganic constituents," by Maynard A. Amerine; 5, "Fermentation, drying, and storage of cacao beans," by P. A. Roelofsen; and 6, "Some aspects of the biochemistry of apple and pear fruits," by A. C. Hulme.

Two of these subjects, the first and the third, are of direct interest to cereal chemists. We would be remiss, however, if we did not examine the information that is presented by the other four authors. While it is true that they are dealing with food commodities which are generally not of direct interest to cereal chemists, such reading can lead to thoughts and theories which might be directly applicable to our field. For example, Dr. Amerine points out that several metals in wine affect the flavor of the wine, apparently through influence on enzyme systems. Is such the case in cereal products as well? The influence of trace elements and more generally of cations on the biochemistry of apple and pear fruits is also related in some way to enzymatic action, according to Dr. Hulme, and in this case the interest is then extended to storage stability. Is such also true of cereal products?

These thoughts occurred to the reviewer while reading the book. I'm sure that many other ideas will come forth as other cereal chemists examine this volume.

Of specific interest is the article by Dr. Milner covering the work which has led to the development of radiographic techniques for detecting insect contamination in grain. A particularly clear treatment is made of the separation of kernels through density differences and the possibilities that this might have in industrial production. Insect-damaged grain kernels are lighter and therefore react differently under a force. This technique can be used to clean insect-infested grain.

Dr. Scott Blair's treatment of rheology in food research is particularly good. Not only has he discussed cereal products, but he has extended his observations to many types of foods. Scott Blair's review of some psychophysical problems is thought-provoking. For example, with regard to doughs the author concludes: "Thus apart from stickiness, whose importance had not previously been fully appreciated, even the skilled baker is not very good at distinguishing rheological differences in doughs." Since at the beginning of the development of rheological methods one had to depend upon the opinion of the skilled baker to correlate the measured differences that were observed, one might ask if our present methods are based upon sound beginnings. Obviously, there must be soundness since these methods have been useful. On the other hand, one might ask, are they the best?

Scott Blair makes it clear that, while we have made much progress in devising methods for measuring rheological properties, most of these measurements are empirical in nature. There is a drive among scientists working in this field to get back to fundamentals. This may not mean fundamental measurements. Perhaps suitable theories are what we lack. Whether the theory follows measurements or measurements follow theory is a never-ending argument. The best that can be said for rheology is that some of the fundamental measurements and some of the theoretical explanations are still lacking.

■ ■ ■ ■ ■

Plant Breeding and Cytogenetics, by Fred C. Elliott; 395 pp., illus. McGraw-Hill Book Co., Inc., New York, 1958. Price $8.50. Reviewed by L. P. REITZ, Crops Research Division, USDA, Beltsville, Md.

An experienced wheat breeder and

cytogeneticist, and teacher of undergraduate and graduate students, has brought together in this book broad coverage of the principles basic to an intelligent approach to plant breeding. The material deals with the older fundamentals and the newer methods of breeding. A wide range of plant examples is used in the explanation of principles to show how and under what conditions such methods have been, or may be, used. Controversial issues, for the most part, are handled with tact, and without taking sides. Students of plant breeding will welcome this reference as a valuable addition to the literature. Throughout there are numerous citations to original research reports and special review articles. Most of these citations are to works published during the last 10 to 12 years.

The subject matter is not all at the same level, as the author admits in his preface, and it is somewhat surprising to see some of it included at all; namely, the last chapter, which deals with administration and organization of plant and animal research, regulatory programs, history, and legislation. However, some readers and teachers may find the material appropriate in a book of this type.

The thirteen chapters fall into four groups: Chapter 1 covers pollination habit and mode of reproduction in diverse crop and ornamental plants, even though the chapter title obscures what is to be treated; Chapters 2 to 6 deal with cytogenetic aspects of plant breeding, polyploids, and mutations; Chapters 7 to 12 contain the traditional and general methods of breeding; and the last chapter, already referred to, discusses organization for plant improvement. Most books progress from less complex to more complex aspects of the subject, but in this volume, you have the more technical part in the first six chapters.

This reviewer wishes more had been said on recombination in plant breeding because this, after all, is the crux of all plant breeding; the author is to be congratulated for giving the subject chapter status. It is hoped that the optimism expressed for mutation breeding will be upheld in practice, for some of the evidence supporting accomplishments with X-rays and atomic radiation has been challenged. The author points out that experience gained so far with induced mutations in crop plants is rather limited and that as a breeding method it should supplement, not replace, conventional methods of selection and hybridization, aiding principally in the production of variability and in recombination through increased translocation frequency.

Seedsmen, farmers, and nurserymen will be interested in the chapters "The nature of crop varieties," "Testing plant materials before release as varieties," "Handling plant materials after release as varieties," and in other chapters, too, especially if they have background in technical botany and genetics, a general interest in plant breeding, or a flair for gardening. Cereal chemists can expect nothing from the book unless they, too, have a side interest in the modes, manners, and jargon of plant breeders.

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Information and Communication Practice in Industry, edited by T. E. R. Singer; Reinhold Publishing Corp., New York, 1958. Price, $8.75. Reviewed by A. W. CAVALLARO, Merck & Co., Inc., Rahway, N. J.

An outgrowth of the rapid increase of knowledge since World War II has been recognition of the perplexing problem of communication. To those anxious that the fruits of scientific accomplishment in industry, education and government be useful as well as fertile, it is fortunate that "communication" is the subject of more and more symposia in these areas.

Of coequal importance with the understandable relating of knowledge, i.e., communication, is the the retrieval of information once filed. Here is a book that recognizes the problems of the retrieval as well as the communication of facts.

Each chapter is written by a specialist in the field and may be regarded as an authoritative guide. Among the subjects discussed are technical writing, editing, illustrating, and classification; information services and their part in internal communication; operations research; patent collections; research files; mechanical aids to presenting technical papers; punched cards; training the literature scientist, translating; designing tables of data, indexing, and abstracting.

One of the most interesting and perhaps most useful chapters is the one entitled "Linguistics, language, and terminology," which delineates the importance of clear writing in communicating. Surely it would be a pity if the importance of painstaking and time-consuming scientific investigation were lost, in great part because the author had failed to communicate what he achieved.

This book will be of interest to persons on both the management and the scientific workers' levels because it provides a guide on how to improve the total company information and communication practice; to the worker because it spells out in detail how to solve the problems covered in each chapter.

■ ■ ■ ■ ■

Tools for Machine Literature Searching, by J. W. Perry and Allen Kent; with Semantic Code Dictionary, John L. Melton, general ed.; 972 pp. Vol. 1 of Library Science and Documentation Series, Jesse H. Shera, general ed. Price, $27.50. Interscience Publishers, Inc., New York, 1958. Reviewed by C. H. KRETSCHMAR, General Mills, Inc., Minneapolis, Minn.

Volume 1 of this planned series of texts and monographs is designed to serve three special groups of persons: 1) advanced students of library science, 2) personnel engaged in providing information services, and 3) professionally active librarians and information specialists. The descriptions of the principles, techniques, systems, and equipment presented should prove to be of practical value for all individuals confronted with the problems of developing and operating information-retrieval systems.

The book is divided into four parts, of which the first two present an introduction to machine literature searching and the engineering of machine literature searching systems. Some of the topics discussed in these parts are a review of new devices and methods, coding and document analysis, and the cost of machine literature searching. The third part records procedures for analyzing, encoding, and searching of recorded information, as developed and operated by the authors and editors. The fourth part is the semantic code dictionary which has two divisions, the English-Code Dictionary and Code-English Dictionary.

In checking the dictionaries for subjects of interest to cereal chemists, it is the reviewer's impression that

additional subject entries are needed. This is not surprising, since the efforts of the editors and authors have been directed towards other fields of interest. Should a cereal chemist or special librarian wish to develop a subject-heading list for his own use, the authors' suggestion in the preface could well be followed—that the dictionaries may be considered as a thesaurus, a cross-reference tool, or a subject authority list. Arrangements could also be made to utilize the facilities of the Center for Documentation and Communications Research at Western Reserve University for developing specialized information retrieval systems.

■ ■ ■ ■ ■

Symposium on Protein Structure, edited by Albert Neuberger; 351 pp. John Wiley and Sons, Inc., New York, and Methuen and Co., Inc., London, 1958. Price, $7.75. Reviewed by DALE K. MECHAM, Agricultural Research Service, WURDD, Albany, Calif.

A symposium on protein structure, sponsored by the International Union of Pure and Applied Chemistry, was held in Paris July 25–29, 1957. The papers presented at that meeting, together with some contributions from discussions of the papers, have been edited by Dr. Neuberger and published in this book. Although the scope and detail of treatment differ from paper to paper, all are informative and authoritative. It may be expected that workers in protein chemistry will be most interested in the book, but it also should have a more general appeal to biochemists or chemists who are interested in learning something of recent progress and directions of current work on proteins. For such a reader, who wants neither a complete coverage of protein chemistry nor a composite of abstracts of recently published papers, this volume seems especially suitable. It offers a wide selection of topics, and most of them are dealt with at sufficient length to permit some general discussion of present status and implications for the future.

Papers on methods and general problems make up the first one-third of the book. The former include discussions of zone electrophoresis and chromatography of proteins, by A. Tiselius and H. G. Boman; the characterization of lower-molecular proteins by dialysis, by L. C. Craig and co-workers; separations of peptides, by F. Sorm and B. Keil; and quantitative paper chromatography of amino acids by isotope dilution, by F. Turba. The general papers include discussions of species differences in cytochrome-c and other proteins, by H. Tuppy; the configuration of globular proteins in aqueous solutions, by C. Tanford; the study of protein structure by use of deuterium exchange, by K. Linderstrom-Lang; and the O-C bond angle in the N–H ···O–C hydrogen bond in folded polypeptide chains, by L. Pauling.

The remaining papers deal with specific proteins, but the aspects discussed are varied. In the case of tobacco mosaic virus, H. Fraenkel-Conrat and K. Narita provide a relatively brief but comprehensive report that covers the size and shape of the virus particles, degradation of the virus and isolation of the virus protein, unusual features of the amino acid side chain reactive groups, and primary structure (amino acid sequence) studies on the protein; while a paper by G. Schramm and coworkers is concerned almost entirely with primary structure studies of the protein, and a report by Rosalind Franklin deals with X-ray diffraction studies of the protein. The contribution of E. L. Smith, R. L. Hill, and J. R. Kimmel on papain also is comprehensive, covering general properties and homogeneity, the sulfhydryl group (only one is essential to activity of the enzyme) and sulfur distribution (the usual forms in which sulfur is found do not account for two atoms of sulfur per mole), studies of primary structure, activity of the partially degraded (including autodigested) enzyme, kinetic studies, and a tentative reaction mechanism. In contrast, of two reports on ribonuclease the one contributed by C. H. W. Hirs, W. H. Stein, and S. Moore is concerned entirely with amino acid sequence studies; the second, by C. B. Anfinsen, devotes about equal space to amino acid sequence studies and other studies correlating enzymatic activity with other aspects of the protein structure. Other proteins dealt with, in aspects ranging from X-ray to immunological studies, include myoglobin, hemoglobin, trypsin, chymotrypsin, pepsin, lysozyme, pituitary hormones, and insulin.

The papers of H. Tuppy, F. Turba, and G. Schramm and co-workers are in German; those of P. Desnuelle and M. Rovery (on chymotrypsinogen) and C. Fromageot and co-workers (on lysozyme) are in French.

Discussion

(Continued from page 63)

how simple or complex the problem may be?

It is not difficult to imagine the consternation of cereal chemists if a useful method of determining absorption and mixing time (for a given formula, mixer, and temperature) could be derived from the change in the adhesive properties of a dough measured by some form of a tackmeter.

The preponderance of rheological work on doughs has been done on nonyeasted systems, since the classical approaches have no end of complications in sample preparation and handling of yeasted doughs. This is understandable, but does not excuse the rheologist from reducing his knowledge to a test, usable in shop and laboratory for proper absorption and mixing time, on the flour-formula system to be baked. The tackmeter may lend itself better to yeast-dough testing than present methods.

The Conclusion Reached

Returning to the questions asked earlier, this writer states that not only is our interpretation of existing methods and indices lacking, but there is reason to believe that not all of the aspects have been investigated sufficiently to say that the proper physical tests are available to understand flour behavior in the formation of dough, even to the extent of objectively measuring physiological or psychological phenomena related to judging absorption and mixing time.

In closing, may the writer hope that the introduction of this subject, which is limited to one particular phase, will prompt a contradictory view before our meetings and papers become expressions of cautious competitors instead of competing colleagues?

List of References

1. GREEN, H. Industrial rheology and rheological structure. Wiley: New York (1949).
2. MILLER, B. S., HAYS, BETTE, and JOHNSON, J. A. *Cereal Chem. 33:* 277 (1956).
3. SCOTT BLAIR, G. W., ed. Foodstuffs, their plasticity, fluidity, and consistency. North-Holland Pub. Co.: Amsterdam; Interscience: New York (1953).

People, Products, Patter

• • • People

H. N. Bergsteinsson appointed chief chemist at Standard Milling Co., Buffalo.

Carl R. Fassler named vp-sales, Mennel Milling Co., Toledo, from general sales manager; he was previously a flour broker in the New England area.

Ronald M. Finch, with Wallace & Tiernan, Inc., since 1922, retires; headquartered in Minneapolis from 1923 to 1943, then in Chicago as manager of flour division, until now.

Clarence W. Gibbs retires as sales manager for Northeast Region, Merck & Co., Inc., Chemical Division; formerly manager of horticultural and insecticides department. As sales manager he helped pioneer Merck agricultural and animal health products.

Philip P. Gray of Wallerstein Co. was guest lecturer on Jan. 7 at the course in baking technology given by **Siegfried S. Lichtblau** at the School of Technology of the City College of New York. The subject was enzymes and their nature, particularly the use and function of amylases in baking and other aspects of industrial use.

Robert L. High appointed director of applied research, Keever Starch laboratories, from technical sales.

Vincent Lawson of Pillsbury's Buffalo lab. staff recently returned from a brush-up course at American Institute of Baking.

Dudley F. Lum, manager since 1927 of Chicago branch office, Givaudan Flavors, Inc., begins partial retirement by relinquishing these duties to **Robert L. Williams.** Lum will continue serving old customers in Chicago area.

Walter M. Miley appointed director of basic research, Keever Starch Laboratories.

Claude L. Moore died on January 14 after a brief illness. He was chairman of the original Niagara Frontier Cereal Chemists' Association, which later became the Niagara Frontier Section of the AACC. He saw the Buffalo laboratory of General Mills grow under his direction, from 1905 when he was the entire lab staff, until 1953 when he retired. His many friends will be pleased to know that Mrs. Moore's health is excellent and that for the next few months she plans to continue living at 91 Meadow Lea Drive, Buffalo 26, New York.

Clifford A. Nelson elected vp-production, Mennel Milling Co.; previously plant manager and, earlier, director of products control, over 23 years of association with Mennel.

Elmer M. Nelson, director of the division of nutrition, Food and Drug Administration, Washington, D.C. died on December 24, 1958.

Bernard L. Oser named lecturer on the faculty of Columbia University, institute of nutrition sciences, school of public health and administrative medicine; is president and director of Food and Drug Research Laboratories.

Hugh K. Parker, AACC president 1951-1952, retires from a long career with Wallace & Tiernan, Inc., beginning in 1921. He was instrumental in introducing W&T milling products in Europe and formed its English and German branches.

Charles G. Walker joins development department of Proctor & Gamble's Food Division.

Frank W. Warren, regional agricultural sales manager for Merck & Co., Inc., Chemical Division, heads new 13-state North Atlantic Region for the company.

• • • Products

Laboratory polarograph. A new recording polarograph has been designed for maximum simplicity of operation for the routine analyst. According to the announcement, it includes full facilities for every phase of conventional polarography, with full-size recording and analytical accuracy, at an economical price; is flexible and adaptable to future accommodation of specialized techniques; permits direct alternate use as a recording potentiometer of 2.5-mv. range. Inquire of E. H. Sargent & Co., Dept. RP, 4647 W. Foster Ave., Chicago 30.

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Moisture tester. The Ohaus model 6000 moisture determination balance is described as a self-contained unit comprising a magnetically damped analytical-type chain balance as the weighing system, combined with a 650-watt infrared heating element. The sample of material is placed on a disposable aluminum foil pan, heated and dried; with a single dial setting, the amount of moisture can be read directly at any time during the preset time cycle. Distance of heater from sample is adjustable from ⅛ in. to 1¾ in. The stabilized pan permits use with liquids as well as solid and pulverized materials. The balance can also be used for direct weighing up to 10 g. with a sensitivity of 10 mg. For more information write: Ohaus Scale Corp., 1050 Commerce Ave., Union, N. J.

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Ultraviolet microscope. Bausch & Lomb announces a microscope with a new RCA-developed "ultrascope tube" which allows visual focusing with ultraviolet light. The tube is an electronic component capable of receiving an ultraviolet image at one end and converting it to a visible image, to be viewed under magnification, at the opposite end. Research technicians can use the microscope, which is compact and easily portable, to determine relative absorption characteristics, and the study of synthetic

fibers is one of its projected uses. More information from: David Templeman, Product Information Bureau, Bausch & Lomb Optical Co., Rochester 2, N. Y.

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Moisture in wheat. One-minute moisture determinations in samples of wheat grain, wheat flour, and tempered wheat by means of nuclear magnetic resonance (NMR) are described in Schlumberger's Material Study Report 10.58, available on request. The study describes the measurement of moisture content in wheat grain by the NMR technique, and suggests that analysis of tempered wheat may be a solution to spontaneous heating of wheat in storage. Calibration curves for wheat flour and wheat grain are given. Write: Schlumberger Well Surveying Corp., Ridgefield Instrumentation Division, Ridgefield, Conn.

• • • Patter

American Society of Brewing Chemists. Montreal will be host to ASBC members and guests on their Silver Anniversary Convention during the week of May 10–14, 1959. Headquarters will be the new Queen Elizabeth Hotel. The planning committee is busy gathering material and ideas with which to play up the silver anniversary theme. Five special speakers will present the highlights of the past quarter-century. W. D. MacFarlane, chairman, is aided by Philip Gray, Fred Baselt, Earl Stewart, and Eric Kneen as ex officio member. For the ladies, tours are being planned to include well-known shrines and cathedrals, and other features of one of the more interesting cities on the continent.

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Association of Operative Millers. Meeting in Saskatoon on November 21, members of Prairie District No. 13 AOM were greeted by two of their officers, president R. C. Bradford and executive vice-president Donald S. Eber, and by AACC President C. L. Brooke. Each of the three gave a short, informal talk. Mr. Brooke recalled that Canadian cereal chemists joined the Association in its early years, and he assured those in his audience that their support and their very real contributions have been most valuable. He read a statement from a recent number of the British journal **Milling**, commenting on the 1958 AACC annual meeting: "Cereal chemistry has become an important profession. It is within our memory when it was either rejected or looked upon with misgivings. Now it is universally accepted, and by none more seriously than the grain millers of the United States" — and Canada, Mr. Brooke added with emphasis.

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Sterwin's annual conference. Shown on the steps of a building at Alabama Polytechnic Institute in Auburn is a group of executives and salesmen of Sterwin Chemicals, Inc., just before they returned to laboratory work after an annual conference and three-day sales meeting in January. The talks reviewed 1958 accomplishments and discussed 1959 sales goals and promotional campaigns for Sterwin products and services to customers in baking and milling, food, confectionery, and sanitation. Front row, starting second from left: William X. Clark, vp-sales; R. S. Whiteside, president; J. K. Krum, assistant technical director; and L. R. Patton, assistant sales manager.

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Sterwin moves Minneapolis office. Sterwin Chemicals Inc. has moved its office in Minneapolis from 533 Metropolitan Building to 3424 East Lake St., Minneapolis 6, Minn. Lyle Carmony continues as manager of the office. Headquarters offices are in New York City.

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FDA meeting for heads of organizations. National President Clinton L. Brooke represented the AACC at a conference in Washington, D.C., on November 18, 1958, called by the Food and Drug Administration. Participants were heads of many national organizations. Mr. Brooke made a statement on behalf of our Association, pointing out its close collaboration with the FDA and mentioning our current series of sanitation schools in which well-qualified FDA men are acting as instructors.

There was some discussion of the efficacy of the Hale Amendment which makes it possible to change existing standards of identity for foods through publication of proposed amendments in the **Federal Register.** The representative of the American Bar Association recommended this procedure.

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New booklet about zein. Corn Products Sales Company is offering a new 20-page booklet entitled "Zein — a versatile product for industry," which describes the characteristics and uses of Argo Brand Zein G200. Some industrial uses previously barred to most proteins are now being filled with zein, the booklet says. It describes characteristics of formulations based on organic solvents, and advantages of water dispersions of zein. A number of specific uses, among them food coatings, are discussed. Copies are available on request: Corn Products Sales Co., 17 Battery Place, New York 4.

EMPLOYMENT NOTICES

RESEARCH BAKER. To assist in the operation of test baking formulation laboratories for one of the nation's leading food processors. Degree in baking science, cereal chemistry or food technology. Some experience with bakery goods, helpful but not essential. Position offers excellent growth opportunity in expanding program. Send resume in confidence to:

Calbert Butler
THE PILLSBURY COMPANY
Minneapolis, Minn.

RESEARCH CHEMISTS wanted, for practical cereal research. Degree in cereal chemistry and some practical laboratory experience necessary. Excellent opportunity with old established company for person with imagination and proper qualifications. Submit resume stating age, experience, education, personal background and salary requirements. All replies held in strict confidence. Our employees know of this opportunity. Reply to: CEREAL SCIENCE TODAY, Box 2159, University Farm, St. Paul 1, Minn.

AACC

LOCAL SECTIONS

Midwest Section met on February 2 to hear George T. Daughters of the Food and Drug Administration discuss problems raised by the recent legislation on food additives. For instance, it places bakeries under a new set of regulations which all must understand to comply with the law; a number of these are already in effect and others will become effective after various periods. Mr. Daughters, who was for four years chief of the Chicago district for F&D, has recently been transferred to the newly formed Detroit district. He introduced the new chief of the Chicago area, John H. Guill, Jr.

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Nebraska Section, on January 17, were given a conducted tour of the new Biochemistry and Nutrition building on the campus of the College of Agriculture, Lincoln. Leslie Sheffield, chief of the Nebraska Wheat Commission, later showed a film entitled "The last wheat crop," and R. M. Sandstedt showed colored 3-D pictures taken while he toured and lectured in Europe last summer.

The Section donated $100 to the Kellogg Center for Continued Education which is to be built on the College of Agriculture campus.

New officers: Howard Becker, chairman; Joe Nigro, chairman-elect; both of Nebraska Consolidated Mills, Omaha.

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Central States Section met January 24 at the Sands Motel Rathskeller, St. Louis, for a before-and-after-lunch session, beginning with a short business meeting. Paul Hoffman, of Monsanto Chemical Co.'s development department, organic division, spoke on "Use of pesticides in the production and handling of grain products." The afternoon program included a tour of Monsanto's inorganic research laboratory, and two talks given by company personnel: "Storage stability of leavening systems in self-rising flours" by James F. Conn; and "Measurement of leavening rate characteristics under performance conditions" by James L. Vetter.

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Southern California Section's January meeting was held on the 6th at Rodger Young Auditorium, Los Angeles. Bob Burns presented the sound film "Domaker," which has been released by the Baker Process Co., a division of Wallace & Tiernan. The film showed how the equipment for continuous doughmaking is installed and operated, and other aspects of the process. Then John Baker, who began work on the method about 18 years ago, traced it from the origin of the idea through development of the equipment, describing some of the problems that arose and methods by which they were solved.

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Niagara Frontier Section celebrated its 30th anniversary with a dinner meeting on February 9, with National President Clinton L. Brooke present as guest speaker. Mr. Brooke brought greetings and congratulations, both personal and on behalf of the Association, and spoke on "The past, present, and future of the cereal chemist."

Officers for the coming year are: Jack Monier, chairman; Robert Van Burek, vice-chairman; Franklin Wagner, secretary; Charles Bronold, treasurer. Executive committee members are newly appointed Victor Lawson, with John Adourian and Stanley Skelskie continuing.

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Canadian Prairie Section met on January 20 in Winnipeg to hear I. Hlynka, who recently returned from a trip in Japan, speak on his observations on cereal science in that country. Dr. Hlynka outlined the various types of research being done and the progress made to date, covering all the main research centers, and showed colored slides taken at the various universities.

Drip-Catcher

Problem: It is common practice to keep a beaker under the dispensing buret for the concentrated sulfuric acid used for protein tests. The tip of this buret is usually quite high above the bench, so that drops of acid falling into the beaker may splash out onto the bench-top, causing an unsightly and hazardous condition.

Solution: Stand a short-stemmed funnel in the beaker. A drop of acid striking the sloping wall of the funnel will glance across to the other side and drain down into the beaker, instead of splashing out onto the bench-top.

Rough Counterweights

When large numbers of fat and fiber tests are being run, the time spent in weighing each beaker or crucible twice becomes a considerable item. Also, straight weighing introduces the possibility of error through incorrect recording of the fractional weights.

The use of counterweights, one for each beaker or crucible, will reduce greatly the time required for weighing and also minimize the chance of error. Fat beakers and fiber crucibles are not permanent enough to warrant the time it would require to make up lead or solid brass counterweights for them, such as are often used for platinum ash crucibles.

However, excellent counterweights can be made for this type of ware, using small perfume vials and lead shot and granulated zinc to supply the necessary weight. They may be identified on a small strip of stiff stock such as a file card, placed inside the vial.

It requires only a couple of minutes to prepare such a counterweight and adjust it to within 5 mg. of the piece of ware it is to balance.

When the counterweights are prepared, it is convenient to store them in a block of wood, drilled with holes about ¾ in. deep and of the proper diameter.

Low-pressure Air System

It is sometimes necessary to use large volumes of boiling or otherwise dangerous wash solutions in routine tests. A typical example is the boiling wash water used in

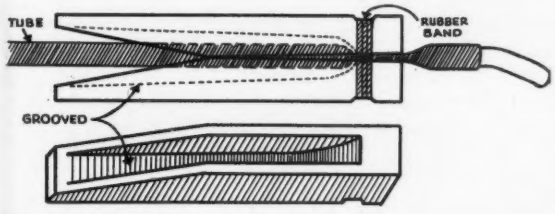
the acid hydrolysis method of sanitation tests. When an ordinary wash-bottle is used there is always a danger of having the liquid flow back into the mouth of the operator. This is a real hazard, as we know from personal experience. To avoid this danger we tried using two different types of "squeeze bottles" but neither one was entirely satisfactory.

We found that an excellent solution for the problem was an improvised air-pressure system operated as follows:

Run 3½ liters of water into a closed 5-gal. bottle, so that instead of allowing the air to escape it is retained and its pressure increased with decreased volume. This will build up enough pressure to lift a column of water about 6 ft., which is much more than can be developed by cheek and lung power, but is still a safe working pressure.

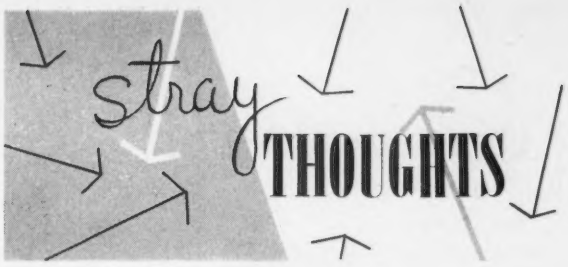
CAUTION: A mercury or water column pressure gage should be installed in the line between the pressure tank and the wash bottle. It should be so adjusted that if the pressure exceeds the determined limits the liquid will blow out, acting as a safety valve. If a mercury column is used, it can take the form of an inverted U with a bottle or large test tube under the open end to catch any mercury that may blow over. Before being placed in service, the bottle should be tested under a hydrostatic pressure of at least twice the intended working pressure.

The compressed air is carried via rubber tubing to the wash bottle. (We use a 1-qt. polyethylene screw-cap bottle here.) The wash bottle tip is separated from the wash bottle proper by a length of rubber tubing (about 3 ft.). This allows the wash bottle to stand on the table top during washing operations. Flow of water is controlled by a home-made wooden clamp which operates somewhat on the principle of a spring-type clothespin (see diagram). The clamp is one of the keys to the successful operation of the system. As indicated by the diagram, it consists of two pieces of wood, each piece grooved nearly the whole length. The rubber delivery tube goes in the groove, so that it is not pinched except at the delivery end. The whole assembly is held together at the delivery end by a tightly wound rubber band. This band also furnishes the pressure to pinch off the tubing when the clamp is not being squeezed.



The pressure system has many advantages. In addition to the safety and convenience, it overcomes a tendency to use insufficient wash-water, so that a more thorough washing is accomplished. It also gives much better visibility of the progress of the the washing operation.

ROSS CORY



Beware "Slide Pluggers"

I am warning all of you that I am going to take steps. I am going to get up and "boo," all by myself, right in the middle of any talk at the next convention in which the speaker incites either of my two pet convention hates. Please bear in mind, also, that I intend to sit at the back of the hall with others who have missed their carnations. (This, of course depends on comparison of the beauties who are up after twelve the night before and the beauties who are up early to bestow carnations.)

If you wish to maintain the staid and dignified atmosphere of A.A.C.C. conventions and avoid raucous interruptions, it will be necessary to do two things.

First, slides must be provided that can be read from the back of the hall. This applies to all writing on all slides, whether graphs or tables, and it most certainly applies to the data in tables. I remember, years ago, that someone used to come to conventions with a monocular, about 8×50, I should say. Seems to me it was our Canadian ex-president, Andy, though I cannot recall that he has carried it recently. Perhaps that is because he decided to do something about slides that could not be read without a glass: he gave us a talk at the 1944 convention in Minneapolis on "The preparation of illustrations and tables," and subsequently published it in *Transactions.*

I have just looked it up and re-read it. There is a lot of good advice. All he omits is the statement about what is going to happen at the next convention when the first poor slide appears on the screen: "Boo-oo-oo!" All you slide pluggers (yes, I said "pluggers") who think we want to see all the data you collected in a year in one undigested mass, had better sharpen up your red pencils and do some deleting.

Somewhat more forgivable, though no less irritating than the "slide plugger," is the "mike-shy guy." I know from bitter experience how difficult it is to try to speak into the mike at all times, but it must be done. What is the good of preparing a fine paper on an excellent investigation and then ruining it by dribbling it down your tie? Make up your mind to talk into the mike. Practice with a wire recorder, if necessary.

In short, remember the guy in the back row — the one who is going to shout "Boo!" Perhaps we need more apparatus. Will someone please take an old coat hanger, wind the hook around the mike stand, and bend the rest to form a U-clamp for the speaker's ears? Or perhaps we need some help from Findlay; I can just see him twirling his rope and catching Bill Geddes by the hind leg as he wanders from the mike to the screen.

Drastic perhaps, but fully warranted.

Observations

This will be my last opportunity to call to the attention of all flour mill chemists that if you want to be included in our flour brand report you must get a ten-pound sample of each flour brand in to our laboratory by the end of April.

This is the first report on the behavior of various flour brands and we will try to make it as thorough and detailed as possible. In submitting your various brands, be sure that you indicate on the label your specifications as to protein and ash so if the sample received does not check with your specifications we can contact you regarding any difference.

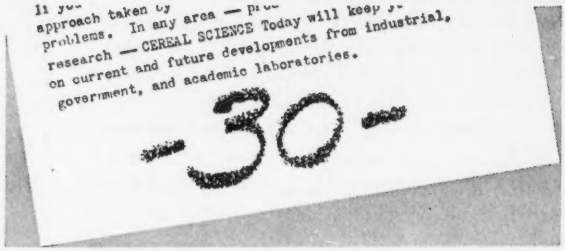
I hope all cereal chemists will make special effort to attend the annual meeting this year in Washington. I have seen a resume of the fine program that Dr. Frank Horan has arranged and certainly it is one that no cereal chemist should miss. I am confident that if management could see the excellence of this program our attendance would be by far the largest we have ever had. I urge all chemists to bring to the attention of management the importance of the contacts that can be made at the meeting and above all the excellence of the program offered.

Jim Doty

DOTY
Laboratories

1435 Clay St.,
North Kansas City 16, Mo.

MILLING FEED ANALYSIS
VITAMIN ASSAYS
BAKING SANITATION


approach taken by
problems. In any area — pl
research — CEREAL SCIENCE Today will keep y
on current and future developments from industrial,
government, and academic laboratories.
-30-

GOOD NEWS!

About the middle of last December we received a note from J. A. Shellenberger of Kansas State College telling us that their new building was finally approaching the construction stage. You'll recall that KSC had a serious fire in August of 1957 which destroyed their mill equipment and building. Dr. Shellenberger sent along a picture of the architect's sketch which is reproduced below.

FOREIGN MEMBERS WELCOMED

Several weeks ago we received a letter from one of our colleagues overseas inquiring about membership in the AACC. He had just learned that membership was not restricted to North Americans and wanted to apply.

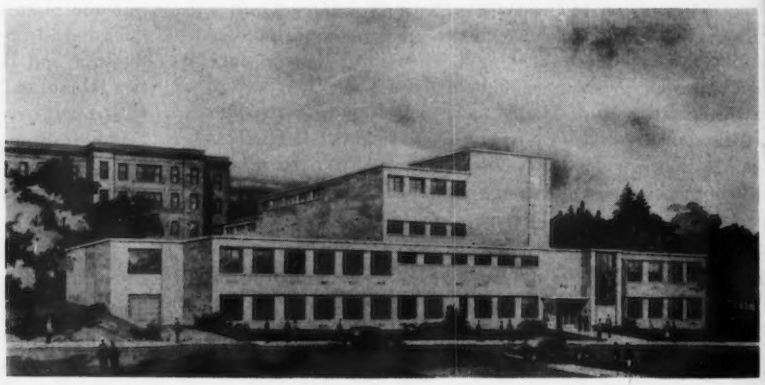
This bit of news came as rather a surprise to us since the AACC has always welcomed chemists from overseas and in fact can boast of members in 25 countries outside of the U.S. and Canada.

We would like to take this opportunity to extend an invitation to cereal chemists everywhere to join with us. A membership brochure containing information about the AACC and an application blank will be sent to you upon request. Write the American Association of Cereal Chemists, University Farm, St. Paul 1, Minnesota.

MAY 3-7, 1959

This is one date you'll want to remember because it's the week of the AACC's 44th Annual Meeting. On pages 69 to 72 of this issue you will find the Preliminary Program. It contains details of the Technical Program as well as information about the Local Arrangements.

Take particular note of the special symposium being held on Monday afternoon, May 4. This will be an outstanding review of current trends in fundamental research as related to cereal chemistry. The speakers are well known in their field and will provide an informative and stimulating afternoon.

The final program, containing abstracts of all papers, will be mailed the first week in April. Watch the next issue of CST for the official reports of all AACC committees.

Architect's drawing of the new building for Kansas State's Department of Flour and Feed Milling Industries.